The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXI. No. 531 AUGUST 31, 1929 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.4.0

Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Acid-Resisting Materials

IN no other industry is the strain upon the materials used in the construction of plant so searching and incessant as in the chemical industry. Corrosive acids of great penetrative force have always been a cause of trouble and expense, and with the high temperatures and high pressures introduced into modern engineering practice, the strain has been considerably increased. The demand, therefore, has steadily become more insistent for materials that will stand up reasonably well to the severe conditions to which they are now exposed. Cheapness, in the ordinary meaning of the word, is of little account, for where the very best available is none too good for the work, cheap material of inferior quality is simply a waste. The two considerations that dominate the problem are the length of life of the plant and the efficiency and cleanliness of its operation while it is in work. A short-lived plant of low-grade material means repeated expenditure on renewal and replacement, and in certain operations, where the purity of the product is of the first importance, quality may suffer. It is, therefore, real economy in chemical works to use the best material available, even though the initial cost may be a little higher.

As usual, the demand for materials with a higher degree of resistance to corrosive influences, and capable of withstanding higher physical as well as chemical stresses, has produced the supply. As our correspondent Mr. Rex Furness indicates in his article on the subject, there is a very wide variety of material at the choice of the chemical engineer of to-day. Apart from the special metals and alloys that metallurgical research has produced, there are enamels, bituminous cements, stoneware, glass, etc., of a kind unheard of a generation ago. But as the range of selection is enlarged, so the selective judgment of the user must become more informed and exact, if the best results are to be obtained. If acid attack always took one form, always came from one source and were always concentrated on one point, the defence would be comparatively simple; but where the attack is widely diffused, as it is in chemical operations, engineering tactics of more than ordinary skill are required to meet it. It is here that sound business judgment and technical works experience count for so much, and only where these are applied can the full benefits of the improvement in plant materials and accessories be secured.

In any chemical costing system, plant costs, as regards installation and maintenance, must necessarily be high. In experience, however, it will be found that the higher initial cost of employing the best available material is more than recovered from the longer life of the plant and its more efficient operation. There can, therefore, be no question as to the right policy to follow, where the choice is between the very best material at a rather higher price and the less efficient material at a cheaper rate. Cheapness, here, is the reverse of economy. Where, therefore, it is a case of a new plant or a reconstruction of an old one, the sound rules are very simple. The first is to get absolutely the best materials available. The second is to see that they are selected with the greatest care for the particular function they are required for. And the third—which applies to all operations—is to see that the plant composed of the right materials is handled with care and kept in a good state of health. Fortunately, there is an abundant supply of expert advice now at hand in the selection and application of plant material, and no reputable firm, when asked for advice, would commit the fatal blunder of recommending its own products for any purpose for which they were not wholly suitable. A first order gained by such a method would mean a final loss of all future business. In industries of such a scientific nature as the chemical one, buyer and seller usually know their jobs so thoroughly that honesty is the best policy.

American Opinion on Mergers

AMERICAN chemical industry is just now keenly concerned in the subject of mergers. Size has always appealed to the American mind, and already it is being pointed out that one result of the recent Concannon conference in Paris will be to convince Europe that the United States has the greatest chemical industry in the world. On their return to their various posts, the Government representatives, it is suggested, will be able to make it known "that the du Pont activities greatly exceed all those of the German I.G.; that Union Carbide is greater than Imperial Chemicals, Ltd., and that Allied Chemical and Dye is greater than Kuhlmann and Montecatini together." Concurrently with this come announcements of various American mergers in general chemicals, synthetic fertilisers, explosives, rubber, etc., and already it is suggested that the merger policy may form a good presidential campaign issue for 1932.

Meanwhile our energetic contemporary, *Chemical Markets*, of New York, has been obtaining some representative opinions on the subject. Generally it is held that "the present epidemic of chemical mergers" will finally prove of benefit to both chemical producers and chemical consumers, though it is obvious that the movement will be keenly watched from Washington. It is frankly recognised that with the settlement of the European financial situation, American industry will be faced with keener world competition, and this—in view of the high cost of American labour, which no one ventures to suggest should be lowered—calls for increased efficiency, lower costs of production and distribution, cheaper raw materials, and essentially no higher prices to the consumer. American chemical opinion appears to recognise collective mass production on a yet larger scale as the natural road to these ends. At the same time it looks a little suspiciously upon large movements for price control and for restricting the growth of new organisations. The general conclusion is that chemical mergers are good within reasonable limits. "Consolidations," as the president of Chemical Solvents puts it, "will mean that the whole industry in ten to twenty years from now should, if properly handled, be on a much sounder basis, making the bid for business depend on scientific development and service rather than on price."

Merchandise Marks for Glassware

THE report has just appeared of the Standing Committee of the Board of Trade under the Merchandise Marks Act in regard to the application which was made for the marking of scientific glassware with an indication of origin. The Committee recommends that a marking order should be made, to operate not only at the time of sale or exposure for sale, but also at the time of importation. The order is to apply to all the goods included in list C. and C.(ii) issued in connection with the imposition of Key Industry Duties, other than X-ray tubes; to thermometer blanks and blanks for volumetric measures; and to glass rod.

A rather acute difficulty in the case of glass articles is the question of the manner of marking. The question of disfigurement, to which importance is attached as regards glassware used for domestic and similar purposes, does not arise in the case of scientific glassware. It is therefore recommended that the mark should be applied by one of the following methods: acid-stamping or etching, sand-blasting, engraving, or burnt-on enamel. As regards glass tubing and rod, the indication of origin may be applied in any of the ways suggested at or near the end of each tube or rod, or alternatively stamped, etc., on the wrapper or label of the bundle. In the case of test tubes, microscope cover glasses and slides, and various other small objects, the option is permitted of marking the goods on the container.

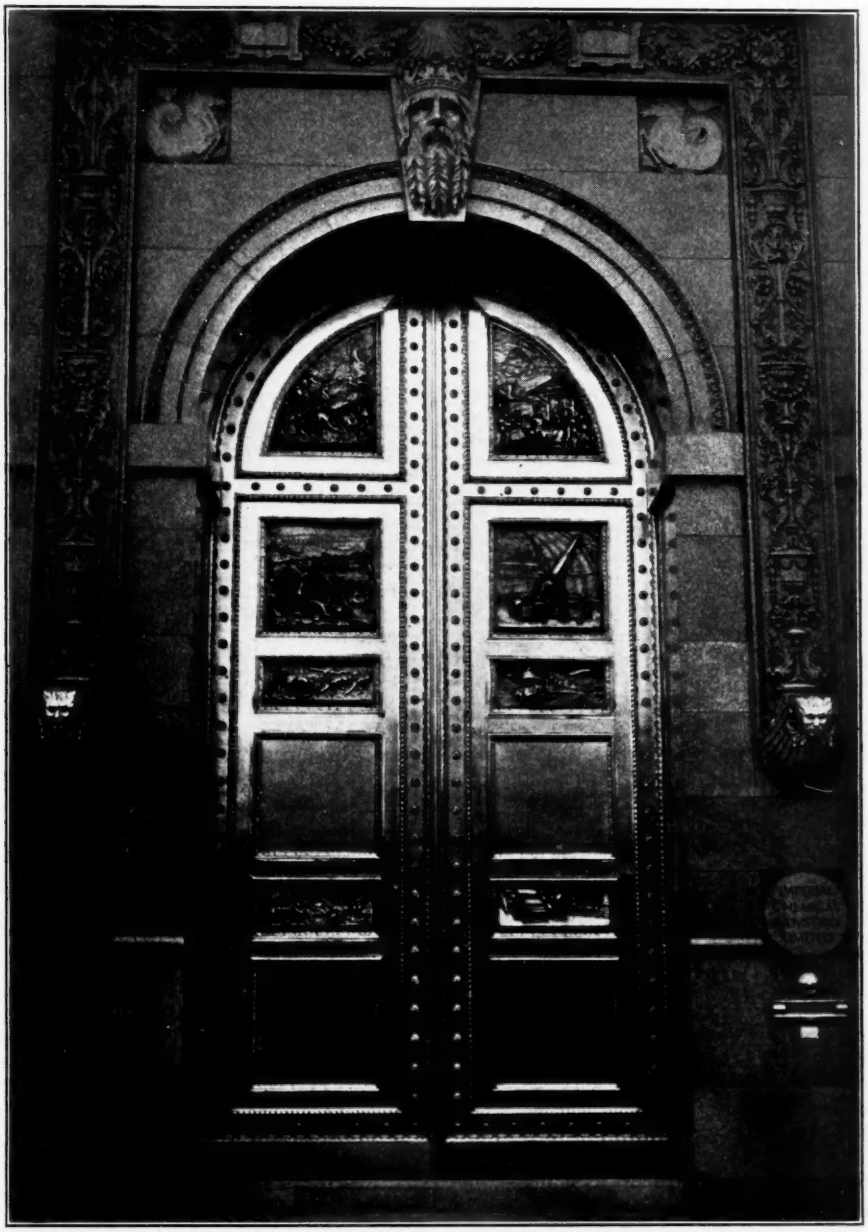
The report (which is printed in extenso on another page) is an important document, which deserves to be studied. Among the interesting points in it is the reply of the Committee to the contention, made by the opponents to the application, that because certain kinds of apparatus are not yet made in Great Britain, they ought to be excluded from the marking order. The reply of the Committee is that it is to be doubted if it is generally known to purchasers and users that the apparatus in question is not in fact made in this country.

Leakages from Gas Mains

WHILE the trouble with the London gas mains kept at a comfortable distance, there was a certain interest in reading of these sudden upheavals, but when, smoking peacefully on the way home, a police officer suddenly pounces upon one and demands that one's pipe be instantly extinguished, the interest takes on an unpleasantly intimate character. Those who use New Bridge Street between Ludgate Circus and Blackfriars Bridge have had that experience at least two days recently. Staffs of engineers and workmen have been very earnestly engaged in excavating the street in search of the cause of a serious gas leakage. The trouble is not, of course, confined to London; it is familiar in American cities, and it is obviously due to the steady increase in the weight of traffic. In this connection, mention may be made of Bulletin No. 265 of the United States Bureau of Mines, *Leakage from High Pressure Natural Gas Transmission Lines*, by E. L. Rawlins and L. D. Wosk, which gives, with many statistics, curves and illustrations, details of a complete investigation that has been carried out into the subject.

The American tests show that when high pressure natural gas mains are in good condition the average leakage rate is 300,000 cubic feet per year per mile of 3 in. lines for screwed pipes, 300,000 cubic feet per mile per year for rubber coupled pipes, and 100,000 cubic feet per year per mile for welded pipes. In many individual cases, however, the actual leakage is more. For example, taking a standard 3 in. screw main, the leakage in individual cases was found to vary from 35,000 to no less than 2,051,000 cubic feet per mile per annum, while as regards rubber coupled pipes the figures were from a negligible amount to 1,960,000 cubic feet per mile per annum on 3 in. pipes. This has directed attention again to the claims of flexible-jointed pipes, though whether this system would be a final solution in the case of large mains laid under heavy traffic routes is a matter for experiment. In any case, the recent troubles present a serious problem to our gas companies' engineers, and research will no doubt be actively directed to it.

Art in Chemical Industry



THE ABOVE PHOTOGRAPH SHOWS THE MAIN ENTRANCE DOORS OF IMPERIAL CHEMICAL HOUSE, AT MILLBANK, RECENTLY PUT INTO PLACE. THE SIZE OF EACH LEAF OF THE DOORWAY IS 20 FEET BY 5 FEET, WITH A 5 FOOT SEMI-CIRCULAR HEAD. THE DOORS, CONSTRUCTED IN SKELETON STEELWORK AND BLOCKED IN WITH A SOLID PLYWOOD IN-FILLING, ARE FACED BACK AND FRONT WITH SILVEROID, A NICKEL COPPER ALLOY PRODUCED BY THE INTERNATIONAL NICKEL CO. THE WEIGHT OF EACH LEAF IS APPROXIMATELY 50 CWT., AND OPENING AND CLOSING ARE PERFORMED ELECTRO-MAGNETICALLY. EACH LEAF IS ENRICHED WITH SIX CAST PANELS FRAMED IN A SIMPLE MOULDING. THE CAST PANELS OF THE SOUTH DOOR REPRESENT DIFFERENT PHASES IN THE LIFE OF EARLY MAN. HE IS SHOWN WITH HIS PRIMITIVE TOOLS STRUGGLING AGAINST NATURAL DIFFICULTIES. THE CAST PANELS OF THE NORTH LEAF ARE THE MODERN COUNTERPARTS. THEY SHOW HOW MAN, HELPED BY MODERN SCIENTIFIC METHODS AND TOOLS, IS GRADUALLY MAKING NATURE HIS SERVANT INSTEAD OF HIS MASTER.

Acid-Resisting Products for Chemical Plant

By Rex Furness

In the following article, the author indicates broadly the great range of acid-resisting materials available for the use of the chemical engineer of to-day, and the obligations that industry is under to the science of metallurgy. Mr. Rex Furness, whose sight was badly injured during the War while he was conducting research work, adds a personal note: "I have been particularly interested in acid-resisting materials, for had they been available in 1916–17, I should have been able to enjoy my recent holiday in Devon and Cornwall even more than I did. . . . I wish I had had aluminium or nickel-chromium steel at my call in 1917."

THE complexity of modern industry is such that no man may live unto himself. In the production of suitable metals, alloys, and other materials for chemical plant and works construction, there must be co-operative endeavour on the part of the chemist, metallurgist, and physicist at least. The steel craftsman of Damascus, whose blades were coveted throughout the world by every knight at arms, has given place to the physico-chemical metallurgist of to-day, whose every operation is governed by an exact science, so that the art of metal production and working is not presided over even in these days of extreme specialisation by a single genius, be he metallurgist proper, chemist or physicist. The metallurgist has unravelled the secrets of iron and steel and non-ferrous metal manufacture, has studied with the aid of the physicist the complex problems of solid solutions, eutectics, alloy formation and the like, and has made practical and general use of the newer elements of the chemist. The physicist has brought his new conceptions of crystal structure into the foundry and his X-ray apparatus into the testing laboratory.

The Progress of Metallurgy

It is not, then, surprising that the complete metallurgist of to-day has made possible many strides in various directions. He has given the engineer new metals, and cutting steels of amazing powers. He has provided the chemist with new steels without which the great industry of synthetic ammonia manufacture could not have been developed to its present magnitude. He has provided light alloys and steels of great strength per unit weight for the aeronautical engineer and motor manufacturer. The metal parts of dirigibles and airplanes are strong and light and the engines develop great power for unit weight. The steam engine which Giffard fitted into the first airship developed only three horse power, and had a total weight of 350 lb.—117 lb. per h.p. Present-day internal combustion engines will develop several hundred h.p. for the same weight—almost one h.p. per pound weight.

Such advances as are briefly indicated above have helped forward the production of acid-resisting metals and alloys, so that there are available to-day acid-resisting materials to suit every need of the chemical plant constructor.

But two things are essential, namely—

(1) The chemist and chemical engineer must realise the wide choice available and consult the information afforded by the metal manufacturer, and similarly the latter must tell the story of his wares in the appropriate place.

(2) The chemist must try out the various materials under his specific conditions, for no one product will fill the bill in every instance.

An Immense Field

It is impossible in a general article to give more than a broad survey of the subject of acid-resisting products, and it is proposed to deal briefly with chemical lead, iron-silicon alloys, and nickel-chromium steels, reference only being made to the many acid-resisting cements, stone wares, composite products, bituminous paints, synthetic resins and acid-resisting plastics, silica ware, silica-coated plant, enamelled plant, glass-lined apparatus, rubber-lined equipment, etc., whilst the processes of calorising, cosletising, electro-plating, metal-spraying, galvanising, etc., can but be mentioned. In the end, an illustrative instance will be given to show the complexity of choosing suitable materials for acid-resisting purposes, for, in a single process, many different products may need to be employed to counter the attack of a single acid such as hydrochloric acid, according as it be in the liquid form, as vapour, in contact with filtering media, drains, driers, etc.

Chemical Lead

Lead represents a valuable acid-resisting material for many purposes because it is readily worked. Its ductility and low melting point are specially noteworthy, and it is reasonably cheap and durable in service. Suitable lead finds application in the lining of chambers for sulphuric acid production, tanks, vats, etc., for acid and acid salt resistance. In general, it may be considered as the first approach to the cheap solution of an acid-resisting problem, tests being made the basis of final choice.

In the very first place, however, a supply of "chemical" or very pure lead is essential, and it is satisfactory to know that this country possesses such a supply.

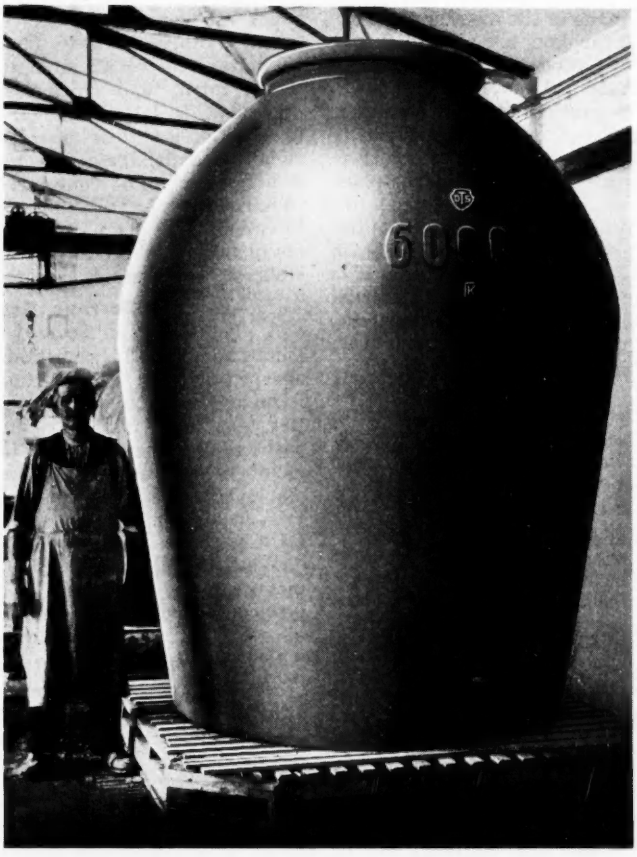
Some English leads run as high as 99·99 per cent. pure, and the specification of the British Engineering Standards Association calls for the following limits—silver, 0·002 per cent.; bismuth, 0·005 per cent.; iron, 0·003 per cent.; antimony, 0·002 per cent.; zinc, 0·002 per cent., and copper, 0·05 per cent.

Much discussion has centred around the action of a small amount of copper in chemical lead, but space forbids any treatment of the question at the moment. It may be said that some evidence has been brought forward for the value of larger amounts of copper than that indicated in the above B.E.S.A. specification, but it is good practice to demand the purest possible chemical lead at the outset. Problems of special character may demand the examination of lead containing a small percentage of copper, but these are infrequent. British chemical lead will ordinarily meet the requirements of the constructor of lead-lined plant.

For certain parts of plants it is desirable to use "Regulus" metal, which is an alloy of lead and antimony, say 92–94 per cent. of chemical lead and 8–6 per cent. of antimony (99·5 per cent. pure). Such metal finds application in the construction of acid eggs, pans, and vessels where self-sustained rigidity in contact with cold acid is demanded. It has been said that in the making of plant parts which are to resist abrasion—valves, taps, ejectors, plugs, acid pump parts, fan impellers, etc.—Regulus metal with 8–10 per cent. antimony should be used. Regulus metal containing larger amounts of antimony also finds use in certain directions.

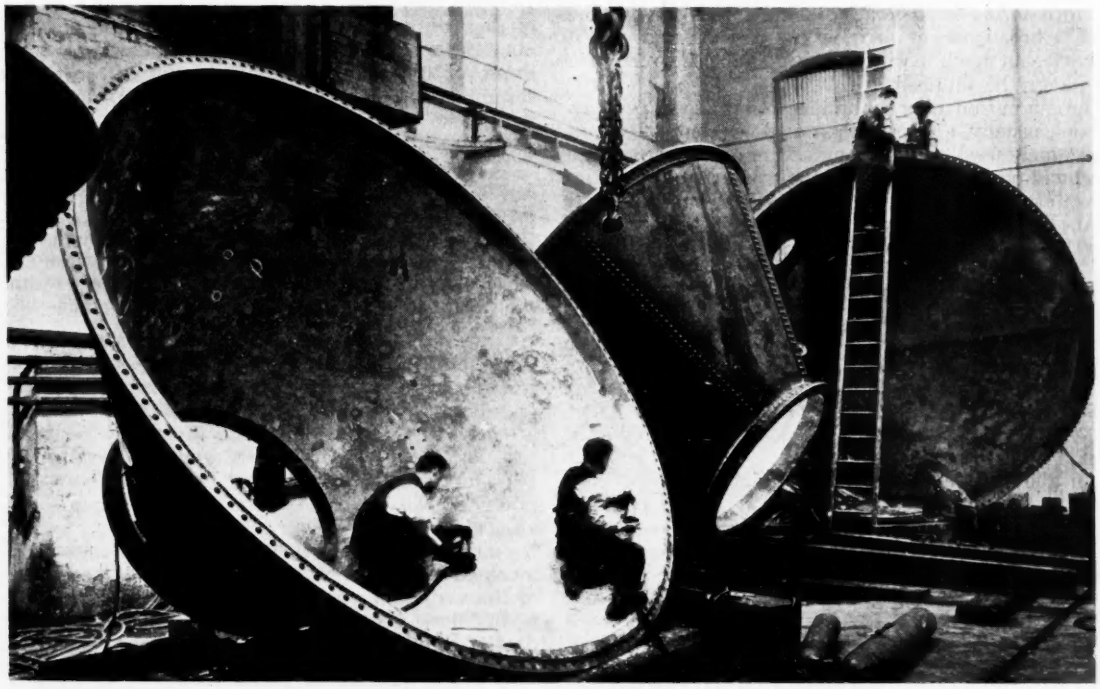
Iron-Silicon Alloys

The iron-silicon alloys have been known for some considerable time, but until relatively recent years, they had found comparatively little application in industry, owing in a large degree to the difficulties experienced in working the alloys in the foundry, hence the somewhat limited range of chemical plant available. Their acid-resisting qualities have never been in question, but they were brittle and difficult to machine. Shrinkage in casting was very



(Top) A large vessel of acid-proof chemical stoneware (capacity 6,000 litres), made recently at the Deutsche Ton- und Steinzeug Werke A.G., Berlin-Charlottenburg.

(Below) K.K.K.—P.G.C. homogeneously lead-lined plant in course of construction at the works of the Power Gas Corporation, Parkfield Works, Stockton-on-Tees.



noticeable, and was the source of many difficulties when it was attempted to construct large pieces of plant.

Great advances have been made in the metallurgy of the iron-silicon alloys, and several makers are able to supply many types of plant, which, by reason of improved foundry practice, are quite reliable in use. A more uniform thickness, for instance, has been achieved in casting, better designs have been worked out, sharp corners are now usually avoided, and large flat surfaces are no longer in evidence, corrugations being cast. Breakages of iron-silicon plant in use are rare.

It is probably correct to say that all the main difficulties of the foundry have been solved, so that the iron-silicon alloys are available for apparatus construction in a wide variety of types. Coils, retorts, autoclaves, distillation columns, condenser tubes, containers for acid transport, valves, taps, centrifugal pumps, agitators, etc., have been successfully manufactured and used in works practice.

The iron-silicon alloys commonly used contain 16–18 per cent. of silicon, and have high acid-resisting capacity, particularly in contact with sulphuric and nitric acids of various strengths, acid salts and liquors, etc., and it has been claimed that a product which satisfactorily resists the action of hydrochloric acid has been produced. Alloys with smaller amounts of silicon are much easier to work in the foundry and machine shop, but they do not possess such high resistances against acids as do the usual types, containing 16–18 per cent. of silicon.

While the use of the analogous element boron in place of silicon has not proved of great technical interest, it may be noted that when a small amount of this element is incorporated into an iron-silicon alloy of the usual type the hardness and brittleness are reduced. Thus, an iron-silicon alloy containing 0·3 per cent. of boron can, it is stated, be turned, drilled, filed, etc., with excellent results.

Nickel-Chromium Steels

The various nickel-chromium steels have sprung into great prominence in recent years, and a great deal of work has been effected in the direction of defining their acid-resisting qualities and of producing alloys which fit themselves into normal engineering practice. It is only possible to give a broad outline of their composition and uses in this article, but much specific data is available and references will willingly be supplied.

A chromium-iron alloy containing from 12 to 16 per cent. of Cr and, usually, not more than 0·35 per cent. of carbon, is now largely used for the manufacture of cutlery, turbine blades, acid pumps, exhaust valves for internal combustion engines, etc. It has useful acid-resisting properties in general. Moreover, it is not attacked by any type of natural water or by alkaline salts, fruit juices, natural acids, etc.

Similarly, the incorporation of 25 to 30 per cent. of nickel into steel adds very considerably to the acid-resisting qualities of the constructional material.

It is when both nickel and chromium are alloyed with iron, however, that the finest acid-resisting steels are formed. Such alloys contain 10 to 30 per cent. of chromium, 7 to 40 per cent. of nickel, and 50 to 70 per cent. of iron.

These alloys have varied properties according to their exact composition, but in every case it is important to note that correct methods of heat treatment, quenching, etc., have had to be developed in order to render the alloys of full service in chemical engineering construction.

The science of working the nickel-chromium steels has been so developed that it is now possible to obtain acid-resisting apparatus in the making of which rolled sections, bars, plates, castings, forgings, etc., are employed. The "workability" of the alloy steels, in other words, is satisfactory. The alloys may be welded by standard processes.

As an indication of the use to which the nickel-chromium steels may be put it may be said that there are available types which resist the attack of the following products, amongst others—namely, phosphoric acid of all strengths, sulphuric acid of all strengths, many fermentation products, nitric acid (within certain limits), fruit juices, organic acids, fatty acids, tar acids, acid salts, etc. Thus, in addition to their direct use in the construction of chemical plant, they have found application in the construction of milk containers, jam-making plant, food-cooking utensils, in dyeing vats, ammonia recovery plant, in crystallising plant (where even with acidic products no discoloration is produced), in power plant, mechanical stokers, superheaters, turbines, etc.

Non-Ferrous Metals and Alloys

A great deal can be said of the value of non-ferrous metals and alloys for plant construction, but these materials are perhaps not so important as those discussed above when it comes to specific acid-resisting qualities. None the less, aluminium finds interesting uses in connection with the distillation and treatment of low and high members of the fatty-acid series, while its alloys are employed in the construction of fat-refining plant, where fatty acids are distilled away from the required neutral fat in vacuo.

Monel metal, nickel, copper alloys and brasses, gun-metal, and so forth have uses in parts of plant coming into contact with acids, acid salts, corrosive waters, fumes, etc.

The Metallurgy of Acid-Resisting Alloys

Many alloys have been made in the metallurgical laboratory which have high resistant capacities against acids in general. Not all of these by any means achieve technical importance, for the reason, in the main, that their "workability" in the foundry or in the engineer's shop leaves much to be desired. It is clearly of theoretical interest only if an alloy be found with marvellous acid-resisting qualities but with properties which render its casting, welding, machining, drilling, etc., matters of extreme difficulty. Not the least reason for the success of the new nickel-chromium steels, the iron-silicon alloys, etc., is the fact that metallurgical practice has been so improved that these alloys can be supplied in forms quite suitable for chemical plant construction, and that they impose no great difficulties upon the ordinary working engineer.

It would appear almost unnecessary to refer to this aspect of the matter of acid-resisting alloys, but in the past it has been seriously neglected. That this is not the case to-day is plain when one remembers the many types of intricate apparatus which have been successfully constructed in acid-resisting alloys. Some examples of such plant have been given earlier in this article.

The Choice of Acid-Resisting Materials

In spite of the vast amount of information available from makers of acid-resisting materials, it is absolutely essential that each problem should receive special attention at the hands of the interested parties. Such tests are readily carried out, and the results obtained must form the basis of choice. Frequently only extensive practical trials will reveal the most economic solution of an acid-resisting problem.

To resist the attack of a single corrosive acid throughout a complete process, several materials may have to be used in the various stages. Let us take the case of the use of hydrochloric acid in the processing of wood for the production of sugar-containing liquors for fermentation to alcohol. The treatment tanks must be highly resistant, and may require constructing in wood or suitable acid-resistant alloys or may have to be lined with hard rubber. Steel kettles lined with glass have been used sometimes in

similar operations. If steam is to be injected, stoneware or rubber-lined steel pipes may be found suitable, whilst heating coils may be found resistant when made in special alloys. Stoneware valves have frequently been used with success in connection with hydrochloric acid treatment tanks, but alloy valves are being employed.

Material processed with HCl may have to be filtered, when presses or vacuum filters are available in wood, stoneware, coated metals and alloys. Similarly, if the "press cake" is to be dried, care must be taken that the fumes evolved do not attack the drier. Hence, driers are made in brick, coated with bitumenastic paints, paraffin, etc., or constructed in acid-resisting alloys. Ventilation ducts must similarly be protected and drainage systems watched. Special "mastics" and other products are available for making acid-proof floors, ducts and the like.

Processing materials with hydrochloric acid involves, then, not only the container problem, but also the problems incidental to handling the fumes, the waste liquors, etc., the drying of the product of acid action, acid fume removal in ventilation systems, and protection of all buildings and plant near at hand.

All problems of acid usage are perhaps not so complicated as the type sketched above, but this has been chosen as an instance in order to emphasise the care which must be bestowed upon every phase of operations involving the use of corrosive acids.

If research be undertaken in the laboratory and search be made amongst the advertising columns of progressive journals and in the special publications of the makers of acid-resisting materials, it it more than probable that any problem will find a satisfactory solution.

Notes on Some Modern Acid-Proof Materials

Plant and Material for Various Purposes

Below we give notes on various products, now on the market, which may be used in processes where resistance to acids is necessary. It will be observed that in some instances very recent advances have been made.

Prodorite Products

An acid or damp proof covering suited to almost any position and with as wide an application as ordinary asphalte is known as Prodorphalte. It is made entirely of acid proof ingredients and can be applied by ordinary unskilled labour. It is easily workable, inexpensive, and can be applied by whatever local labour is available in lining walls or drains, making acid proof sumps, stopping leaks and covering roofs, covering machine bases and floors, making damp courses, repairing factory roads, protecting stanchions and similar services. It only requires heating until workable, and can best be applied by means of a wooden float. It will withstand the action of concentrated hydrochloric acid, not simply on the surface but right through. The manufacturers of Prodorphalte are Prodorite Ltd., of Eagle Works, Wednesbury. Another of their preparations, Prodorkitt, is made of ingredients inert to acid action, with which is included a quantity of scientifically prepared bitumen. The grades are arranged to give different degrees of hardness, and different grades are also necessary to deal effectively with varying temperature conditions. All grades are equally acid proof, and these compounds are often used for floor jointing as they also offer great resistance to wear. There are pipes and gulleys and other fittings available suitable for conveying acids, but the difficulty has been joining these together. Prodorkitt is suited to this service, as it has both the acid proofness and the strength. It is also particularly suited to damp proofing.

A third product of the same manufacturers is an acid proof cement, which can be used by any one capable of using ordinary mortar. It is supplied in powder form and in either quick or slow setting grades. It provides effectively against acid corrosion, and where mortar in walls requires proofing or new walls require building in such a way as to be protected from liquid acid or acid fumes, for buildings which are near to chemical works or chimneys giving off acids, or for walls built in soil which is acid laden, as is commonly the case in industrial areas, it will save the engineer or contractor from much subsequent loss and difficulty.

The main product of the company is, of course, the well-known acid proof material Prodorite. This was originally supplied in floors and tank linings. Recently, the company has perfected a special type of bulk storage container for hydrochloric and other acids. This is a particularly solid type of construction composed entirely of Prodorite, with a suitable internal reinforcement to obviate any chance of cracking. A Prodorite tank, therefore, presents no surface which can be attacked by acid. Many important contracts for bulk storage installations have already been secured.

In connection with the bulk storage of acid, the company has also the means of supplying the necessary pipe lines, fittings, etc., for the distribution of the acid from the storage tank to the various points in the works at which it is required.

Prodorite, Ltd., are the agents for Dexine, Ltd., for England Scotland and Wales, which firm manufactures the well-known Dexonite super ebonite and Dexine products, which are also acid resisting. With these lines Prodorite Ltd. supplies all types of tank linings, pipes, pipe fittings, and any special washers and fittings for the various trades using corrosive substances, such as artificial silk, calico printing, dyeing, bleaching, etc.

Notes on Platinum Ware

As great demands are made on platinum ware as used in the laboratory, it has always been necessary to see that metal of the highest grade is used. For this reason specially pure platinum is used for the construction of platinum crucibles and dishes and other utensils, the quality generally ranging from 99.5 to 99.8 per cent. pure. Pure platinum being a very soft metal, it is generally necessary to alloy it with a small percentage of iridium to render the various articles made from it of commercial service. Platinum with a higher content than 10 per cent. of iridium is attacked only slightly by chemical reagents, including aqua regia. In spite of this, it is especially recommended that crucibles which are frequently exposed to high temperatures should have only a very small iridium content. Experiments have shown that platinum containing an appreciable amount of iridium begins to show serious loss of weight on heating to 900° C., and this loss increases rapidly with the temperature. It is recommended, therefore, that platinum used in crucible ware should contain less than 0.3 per cent. of iridium.

The greatest care is exercised in preparing these utensils to see that they are free from any fault. In spite of these precautions taken in the manufacture, platinum does not lend itself as an ideal metal to be used in laboratory work indiscriminately. There are many substances that attack or combine with platinum at comparatively low temperatures. Caustic alkali, alkaline earths, nitrates and cyanides attack it at red-heat, although alkaline carbonates have no effect at the highest temperatures. Phosphorus, arsenic and silicon attack platinum when heated with it, consequently phosphates, arsenates, etc., should not be ignited in filter-paper in the crucible. Contact with compounds of easily reducible metals like lead is dangerous at high temperatures, because low-fusing platinum alloys are readily formed.

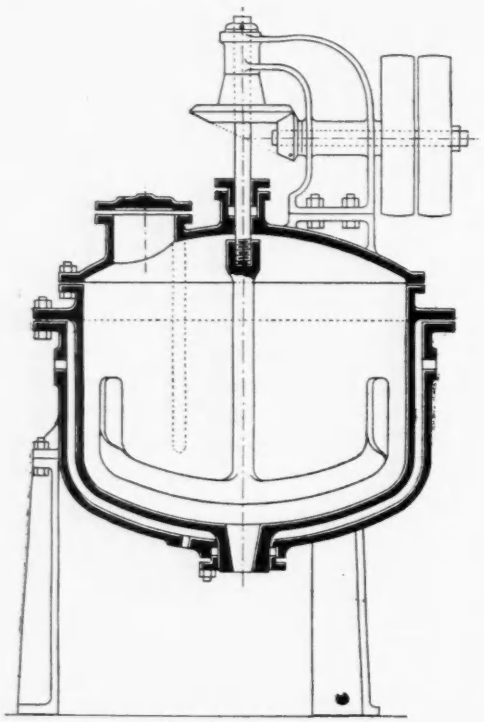
In view of the wide use of ferro-silicon, it is necessary once again to draw attention to the action of silicon on platinum. The greatest enemy of platinum, however, is phosphorus, and for this reason phosphates have to be treated with the greatest care. It should be made a general rule that platinum ware should not be heated to unnecessarily high temperatures, and certainly not with the inner cone of a Bunsen flame, which reacts with the platinum to form a carbide, causing brittleness and general deterioration. In no circumstances should platinum be heated with acetylene. The occasional cleaning of a

platinum crucible with fine sea-sand, and then polishing, will help to prolong its life.

A cheap substitute for platinum has been made in the form of a 90 per cent. gold-10 per cent. platinum alloy. As a matter of fact, gold, for most purposes, resists chemical action almost as well as platinum. Its softness, however, and lower melting point prevent its general use. The addition of platinum, however, gives the alloy the necessary hardness. Where it is necessary to heat substances in dishes or crucibles to high temperatures, platinum is essential. If, however, there is no necessity to heat above 1,000° C., and it is quite certain that this temperature will not be exceeded, the gold-platinum alloy can be used. In this way, crucibles of this alloy have been used for chemical work below 900° C., and for cathodes utilised in electrolysis. This alloy is not recommended when exposed to the full heat of a Bunsen burner, as local overheating may ensue. It should, however, be satisfactory for work in electrical ovens, where the fear of overheating does not arise.

Acid-Resisting Enamelled Plant

THE proofing of metals against acids and other corrosive agents may be very conveniently effected by enamelling. Among suppliers of cast iron enamelled plant the firm of Danto-Rogeat and Co., represented by H. Sloog, of 45, Great Marlborough Street, London, takes a high place. The Danto-Rogeat enamel consists of a layer of pure silica, free from all traces of metallic oxides. This is impervious to the action of all acids (except hydrofluoric) at any concentration, even at ebullition. It is also insoluble in weak alkaline solutions. The products of the firm include autoclaves, reaction kettles, jacketed kettles, tanks, containers, blow-cases and pipes,



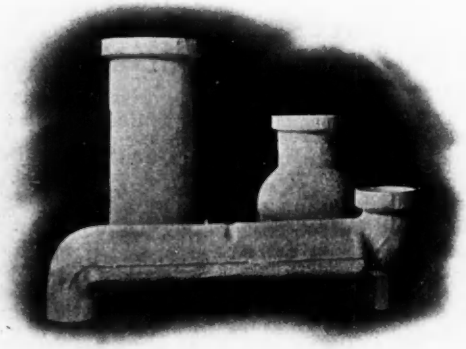
A JACKETED REACTION KETTLE.

evaporating tanks, stills, concentrators, and other plant, in numerous different sizes as well as laboratory apparatus. A very large number of extremely favourable reports have been received from chemical and dye manufacturers, also from food specialists, following upon extensive laboratory tests carried out in their own works on specimen dishes lined with the Danto-Rogeat enamel. Furthermore, the number of vessels installed by the firm during the past twelve months is considerably in advance of that delivered in the preceding year, all of which tends to show that the acid-resistant properties of the enamel are now widely recognised.

As a sample of the type of apparatus made by the firm, the jacketed kettle shown diagrammatically in the accompanying sketch may be cited. This has a bottom outlet, and is complete with cover and stirring gear. It has an inner reinforced shell provided with a collar; a cast iron jacket facilitates heating. The type shown has a flattened bottom offering a favourable surface for evaporation. The size ranges from 6½ to 790 gallons, which supplies all needs from those of laboratories to those of large industrial plants.

Fused Quartz and Silica Ware

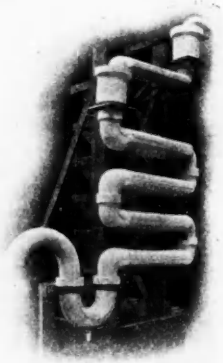
THE resistant properties of quartz and silica are well known, and the material is steadily growing in favour for use in the construction of chemical plant. Plant of pure fused quartz and silica (Vitreosil), a homogeneous and uniform product containing over 99·8 per cent. SiO_2, is manufactured by the



GROUP OF VITREOSIL PIECES FOR CHEMICAL MANUFACTURE.

Thermal Syndicate, of Wallsend-on-Tyne. This material is unaffected by mineral or organic acids, with the exception of hydrofluoric, and, at high temperatures, phosphoric acid. Basins of Vitreosil are, however, extensively and successfully used for the concentration and handling of phosphoric acid. Sulphuric, nitric, and hydrochloric acids, or mixtures of these acids, have absolutely no action on Vitreosil at any temperature or in any concentration met with in industrial use. The material does not "sweat," crack, or disintegrate, however sudden and extreme the changes of temperature to which it is subjected. It is also non-porous to vapours and gases.

Vitreosil vessels are of great value for hydrochloric acid absorption, for nitric acid condensation, for sulphuric acid concentration, and for many other chemical processes where heating and corrosion troubles are liable to be encountered. Moreover, Vitreosil cannot colour the product. This unique combination of properties enables Vitreosil plants to be quickly shut down and restarted without damage it reduces maintenance and supervision charges to a minimum, and subsidiary costs due to escape of liquid or vapours are completely eliminated.



A COLUMN OF VITREOSIL ABSORPTION VESSELS.

As may be imagined, the material lends itself to the manufacture of innumerable types of plant, ware, and apparatus for the chemical and allied industries, physical and chemical laboratories, the lighting and heating industries, optical purposes, etc.

Nickel in Corrosion-Resisting Alloys

Of the many materials now used for combating corrosion, nickel and its alloys form a range of materials amongst which resistance to the corrosion of a wide range of acids and alkalies may be found.

The nickel-chromium "super-stainless" steels, such as "Staybrite," "Anka," "Era," etc., although not inferior to the earlier chromium steels in their resistance to nitric acid, have a much enhanced resistance to a number of other acids. This acid resistance leads to their application in the chemical industry for the construction of autoclaves, retorts, pump rods, etc., while their uses in general industry are rapidly growing. A point not always recognised is that the higher the nickel content of these steels the more easily are they fabricated, and in choosing the material for any particular corrosion problem it is always advisable to have the highest nickel content that will allow of efficient resistance in the circumstances.

With nickel contents above 30 per cent., the nickel-chromium steels, which then may preferably be looked upon as nickel-chromium-iron alloys, show increasingly valuable properties at temperatures above normal. They exhibit considerable resistance to corrosive attack at elevated temperatures, while they retain their strength at these temperatures better than most other materials. With the iron entirely eliminated, the straight nickel-chromium alloys form the most valuable materials at present available for high temperature work, at the same time being useful for resisting the attack of certain particular reagents at ordinary temperatures.

Amongst the non-ferrous corrosion resisting materials, the nickel-copper alloys are well known. Monel metal, a nickel-copper alloy containing 68 per cent. nickel, is unaffected by most acids and by all alkalies, and a combination of this property with considerable strength both at ordinary and elevated temperatures has led to its wide employment in chemical works, textile factories, dyeing establishments, etc. Where the corrosion is not so intense or is of a different character, nickel-copper alloys containing less nickel than Monel metal may sometimes be used economically. Especially is this the case in certain of the food industries and in steam-condensing plant, etc.

A recent development in nickel-containing corrosion-resisting material is the new cast-iron containing about 20 per cent. Monel metal. This alloy, known as "Nimol," promises to be of considerable value to engineers, since besides forming a cheap solution of certain minor corrosion problems, it is also finding use as a high-temperature cast iron.

Advice as to the best alloy for use in any particular purpose is always available to anyone who has a corrosion difficulty from the technical staff of the Mond Nickel Co., Ltd., and inquiries addressed to the Bureau of Information of the company at Imperial Chemical House, Millbank, London, receive immediate and expert attention.

Aluminium Plant

The general properties of aluminium make it a very useful material for the construction of chemical plant. It is of interest to consider the substances with which aluminium may be in contact without undergoing damage. These are as follows: Dry gases—air, oxygen, hydrogen, carbon dioxide and monoxide, chlorine, sulphur dioxide.—Acids—nitric acid of at least 40° Baumé, pure sulphuric acid of 66° Baumé, anhydrous acetic acid, gaseous or dissolved hydrogen sulphide, tartaric acid, citric acid, malic acid, pure phenol.—Miscellaneous—sulphur, carbon disulphide, absolute alcohol, and numerous others. From this list it is easy to deduce numerous operations in which aluminium plant would be of value, such as in the synthetic production of nitric and acetic acids and of ammonia, and the transport of these substances; the extraction, purification and hydrogenation of edible and industrial oils and fatty acids; the nitration of cellulose; the manufacture of ammonium sulphate, and many others.

Aluminium plant of all kinds may be obtained from Victor Blagden and Co., Ltd., of Coronation House, 4, Lloyds Avenue, London, E.C.3, which company is now acting as sole agent for the British Isles of the Compagnie Belge d'Aluminium, of Liége. The available plant includes plant for the manufacture of pure nitric acid; for the hydrogenation of oils; stills; evaporators; autoclaves; tanks and reservoirs, and numerous other types. In addition to its above-enumerated uses, aluminium also finds great application for the construction of vats and tanks for breweries, for which purpose there may be obtained open vats; round and rectangular vats; and cylindrical, vertical or horizontal closed storage tanks of all diameters.

Earthenware and Silica Ware

Earthenware and silica ware for chemical purposes in the widest variety are stocked by Hubert Jones, of King Street Warehouses, Bury. The silica ware is pure 99·8 per cent. silicon dioxide. The firm pays special attention to packing, and insurance is arranged in transit. A special catalogue has been compiled, copies of which are obtainable on request.

Publishers and "Movie-Tones"

Possibilities of a Great Invention

Following a luncheon in London on Tuesday, at which Sir Ernest Benn entertained a number of publishers and other guests, the Western Electric Company reproduced at Bush House, for the first time in England, "sound pictures" of the addresses specially delivered by Sir Ernest Benn (at Oxted), Signor Pirelli (at the Hague), Mr. T. E. Edison (at Florida), and a Japanese League of Nations delegate (at Geneva) for the American Electric Convention at Altantic City last June.

Mr. P. L. Thomson, Director of Public Relations to the company and president of the Audit Bureau of Circulations for the United States and Canada, who conducted the proceedings, referred to the great impression the four speeches, obtained under such interesting circumstances, produced on the conference. The company arranged to have two minute summaries of all the other speeches delivered in person, and there was now available a complete "sound picture" of the four days' conference condensed into two hours. They were largely indebted to Mr. James McGraw, the well-known New York publisher (who was present), for his enterprise in sending one of his staff, Mr. W. H. Onken, editor of the *Electrical World*, over to Europe to arrange for the speeches.

Mr. McGraw, who is chairman of the McGraw-Hill Publishing Co., New York, and who had heard the speeches reproduced at the Convention, testified to the remarkable effect produced by them on the American delegates, and predicted that the "sound picture" would become one of the greatest factors in promoting good international feeling and understanding. Sir Ernest Benn's speech, he said, on "Private versus Public ownership of property" appealed particularly to his American audience.

Developments of the Invention

Mr. Pelley, assistant general manager of the company, indicated the enormous possible developments of the invention in educational, advertising, and even religious fields. Not only, he said, would it be possible to reproduce the lectures of the greatest university and technical authorities for the benefit of students throughout the world, but some great surgical operation, involving the very latest methods, might be made available for the medical schools of the world. Referring to what he called the "plum in the mouth" effect noticed in the case of some of the sound pictures, he said that it was due solely to the poor acoustic properties of a very small theatre. In a large hall, the tones were reproduced most naturally, though the results naturally varied with the quality of the speakers' voices. Mr. Bernard Shaw was regarded as their ideal speaker for reproduction, and Sir Ernest Benn ran him very close for clearness.

Samples of sound film were presented to the guests by Mr. F. S. Fisher, a director of the company, and thanks were accorded the officials for their interesting demonstration. A complete film of his address was presented to Sir Ernest Benn.

Research on Empire Timber

The Empire Marketing Board has approved a capital grant not exceeding £30,000 to be devoted to research on Empire timbers at the Forest Products Research Laboratory at Princes Risborough (Bucks.), under the supervision of the Department of Scientific and Industrial Research. An Empire Timbers Committee is also being set up under the Department, to advise the Princes Risborough Laboratory on the priority to be given in the choice of timbers for test and in other calls on its services.

Merchandise Marks for Scientific Glassware

Report of Standing Committee

The report of the Board of Trade standing committee under the Merchandise Marks Act with regard to the request for the marking of scientific glassware (including tubing and rod) has just been issued as a white paper (H.M. Stationery Office, pp. 8, 2d.). The essential parts of the report are given below.

On May 3, 1929, the Board of Trade made a reference to the Standing Committee for inquiry under Section 2, Subsection 1, of the Merchandise Marks Act, 1926, in respect of imported lampblown ware and scientific glassware of all descriptions, including tubing and rod. The inquiry was held on June 3, 4, 10 and 11, and the evidence of seventeen witnesses was heard, twelve on behalf of the applicants and five on behalf of the opponents. All the evidence was given in public.

Applicants and Opponents

The applicants were the British Chemical Ware Manufacturers' Association, Ltd., and the British Lampblown Scientific Glassware Manufacturers' Association, Ltd. The application was supported by representatives of the workpeople engaged in the industry.

The opponents were :—The China and Glassware Section of the London Chamber of Commerce ; the British Laboratory Ware Association, Ltd. ; and the Electrical Importers' and Traders' Association.

The applicants expressed willingness to restrict their application to the descriptions of glassware which are included in the lists of articles known as C and C (ii) issued in connection with the administration of the " Key Industries " duties, with the addition of thermometer blanks and blanks for volumetric measures, and glass rod, and with the omission of X-ray tubes. The applicants were also willing that certain articles of scientific glassware included in the lists should be exempted from individual marking, mainly on the ground of size, provided that the container in which they are packed bears an indication of their origin.

Evidence for the Application

They stated that in the absence of a mark of origin, it is very difficult to distinguish imported scientific glassware from that made in this country, and they brought expert evidence to show that it is not always practicable to do so, even by chemical analysis. They showed by evidence that there is a desire on the part of scientific users and of public authorities to buy British glassware, and they asserted that, having regard to the method by which this trade is carried on, there is serious risk of confusion. They said that it is customary for purchasers of glassware for scientific purposes to buy their goods from firms generally known as laboratory furnishers, who not only deal in British and foreign glass, but also frequently make some of the goods themselves. The purchaser, therefore, has no means of knowing whether the goods which he is buying are made in this country or abroad, except in those instances in which British and foreign manufacturers mark their products with their names.

They asked for an Importation Order as well as a Sale Order. They attached great importance to an Importation Order owing to the unusual difficulty, even to an expert, of distinguishing between British and imported goods of these descriptions. They added that as the Customs already examine these goods for duty purposes little additional work would be thrown upon them.

Method of Marking Asked For

They asked that the goods should be either acid-stamped, acid-etched, engraved, sand-blasted or marked with burnt-on enamel. They did not consider that a method of marking by label would satisfactorily serve the purpose of informing the purchaser. In this connection they explained that scientific glassware was generally ordered by the scientific user from a catalogue, and was often unpacked and washed by the laboratory assistant before being used. The label would, therefore, frequently be removed from the glass before it reached the user.

The opponents did not raise objection to the marking of certain specific articles, such as " boiling glass " (beakers, flasks, etc.). They objected, however, to the applicants' proposals in regard to the following categories of glassware :—(1) Uncalibrated glassware which is subsequently calibrated in this country ; (2) scientific glass apparatus of descriptions which are not made in this country ; (3) scientific apparatus which includes a number of different articles of scientific glassware ; (4) tubing and rod.

As regard (1), they regarded this glassware, known in the trade as " blanks," as the raw material of their industry, and they claimed that the cost of graduating a glass measure in this country is higher, sometimes much higher, than the cost of the blank, and that an indication of foreign origin would, therefore, be very misleading. They claimed that the glass blanks intended for graduation cannot be regarded as scientific glassware, and that articles of scientific glassware made from foreign blanks which are graduated in this country are properly described as British.

As regard (2), they stated that it is impossible to obtain certain glass apparatus in this country, such as Kipp's apparatus or Woulff's bottles, since the special skilled labour required in their manufacture is not available. They considered that no useful purpose would be served, therefore, by marking such goods, since the purchaser could not exercise the option, open to him in the case of other glassware, of buying an article made in this country. As regards (3), they demonstrated a number of exhibits of apparatus which in their opinion would require a large number of marks under the applicants' proposals. They considered that, in the case of apparatus made in this country with imported glass components, these marks on the glass would mislead the purchaser into the belief that the whole apparatus had been made abroad. As regards (4), they considered that it would not be possible to mark each tube and rod effectively without injury, and that the cost of marking would be prohibitive.

Decision of the Standing Committee

After carefully considering the arguments, evidence and exhibits put before it, the Board of Trade Committee has come to the conclusion that an Order-in-Council ought to be made not only to operate at the time of sale or exposure for sale, but also at the time of importation. Besides the considerations referred to above, the Committee is influenced by the facts that the method of marking which it proposes can most readily and economically be applied to the goods at the time of manufacture, that no serious addition will be made to the work of the Customs, since almost all the goods are already examined for duty purposes, and that the opponents did not take objection to an Importation Order in respect of boiling glassware.

With the modifications dealt with below, the Committee considers that the Order should apply to all the goods included in lists C and C (ii). It does not agree with the opponents' contention that because certain descriptions of apparatus are not as yet made in Great Britain they ought specifically to be excluded from the Order. According to the evidence, steps are now being taken to make some, at least, of these goods in this country, but apart from this consideration, the Committee doubts if it is generally known to purchasers and users that the apparatus in question is not in fact made in Great Britain.

Having regard to its recommendation in the case of other classes of glassware (which are dealt with in a separate Report), the Committee has given very serious consideration to the question whether the option of a label should be allowed. It seems to the Committee, however, that scientific glassware differs materially from domestic glass in two respects. In the first place, scientific glass is not in the main bought over the counter, but is largely purchased from catalogues, and in many classes of articles the labels would be removed by preliminary washing before the glassware was used in the laboratory. In such cases the information as to the origin of the goods would not reach the ultimate users, and the Committee considers it desirable in the public interest that these users should be informed. In the second place, the question of disfigurement, a consideration to which consider-

able importance is attached in the case of domestic glass, does not arise in the case of scientific glassware. The Committee therefore recommends that the mark should be applied by one of the following methods: acid-stamping or etching, sand-blasting, engraving, or burnt-on enamel.

The categories of these goods in regard to which special considerations were put before the Committee at the inquiry are dealt with below.

Tubing and Rod

During the inquiry the applicants expressed willingness to exclude from individual marking tubing or rod under 6 m.m. in diameter or under two feet in length, provided that the container or wrapper bore an indication of origin. They desired, however, that tubing and rod of larger dimensions should be marked near both ends. The Committee has ascertained from the Customs authorities that a different method of marking in the case of different sizes of tubing and rod would give rise to great difficulty at the ports. It has, therefore, come to the conclusion that in the case of all tubing and rod the alternative should be permitted of marking each bundle by means of an indication on the container or wrapper surrounding the bundle or the end thereof, or in cases in which there is no such container or wrapper, by a label securely attached to the bundle.

Test Tubes

The applicants proposed that test tubes up to 6 in. in length or up to five-eighths of an inch in diameter should be exempted from individual marking, provided that an indication of origin be given on the container. This exemption would cover about 85 per cent. of the test tubes imported. What has been said in regard to tubing and rod as to the difficulties at the Customs, applies also in the case of test tubes, and, having regard to these considerations and to the fact that according to the evidence test tubes generally reach the laboratory in the box in which they are packed, the Committee is of opinion that in the case of all test tubes the alternative of a mark on the container should be allowed.

Composite Articles

The arguments presented by the opponents as to the multiplicity of marks on different components of a single piece of imported apparatus are appreciated by the Committee. After careful consideration, however, it has come to the conclusion that, if exceptional treatment were provided in the case of composite articles, Customs difficulties would ensue and evasion of the Order might very well take place. The Merchandise Marks Act clearly contemplates that more than one mark might in some cases appear on a composite article (*vide* Section 5 (3)). The Committee, however, points out that there would be no obligation to mark any glass component of a composite article unless that component were itself included in the lists C and C (ii).

Glassware for Graduation

The evidence showed that there is an appreciable importation of glassware for scientific purposes in the form of "blanks" to be graduated in this country. The relation between the cost of the blanks and of the processes of graduation appears to vary very widely, and the evidence on this point of the applicants and of the opponents differed materially. Naturally the cost of the blank forms a much smaller proportion of the total cost of the completed article in the case of the articles which are graduated with the highest precision, and in some of these cases a large part of the cost is represented by the fee paid for the certificate of the National Physical Laboratory by whom the accuracy is tested. In ordinary commercial work the cost of the imported blank may form a comparatively large proportion of that of the finished article. Some, but not all, of the blanks are subject to Key Industry Duty, and some classes of these blanks (*e.g.*, cylinders, pipettes and burettes) appear to be capable of use for scientific purposes even without graduation. In the judgment of the Committee, however, all of the blanks in question are glassware intended for scientific purposes. It does not think it practicable to draw a distinction between the different classes of blanks imported for scientific purposes, according to whether they are actually charged with Customs duty or whether they are or are not capable of use without graduation. Any such distinction might lead to evasion, and add considerably to the difficulties of the Customs. The Committee has, therefore, come to the conclusion that there should be no exemption for imported blanks.

It is recommended that the Order-in-Council should come into force three months after it is made. The Committee carefully considered what provision should be made to meet the case of the stocks of these goods already in the country, and has come to the conclusion that the best course is to exempt existing stocks in regard to which it can be proved that they were imported before the date of the coming into force of the Order. The recommendations are given in full in the Annex to this Report.

Annex: Recommendations as to Markings

The following classes and descriptions of imported glassware, whether imported separately or as part of any other article, shall bear an indication of origin at the time of importation and also at the time of sale or exposure for sale in the United Kingdom, namely:—

(*a*) glassware of the descriptions included in lists C and C (ii) issued in pursuance of Part I of the Safeguarding of Industries Act, 1921, as amended by the Finance Act, 1926, other than X-ray tubes;

(*b*) thermometer blanks and blanks for volumetric measures;

(*c*) glass rod.

Subject to the provisions of the paragraphs below, the indication of origin shall, at the option of the person by whom it is applied, be acid-stamped or etched, sand-blasted, engraved or applied by burnt-on enamel.

In the case of the following goods the indication of origin may, at the option of the person applying it, be stamped, printed, stencilled, or branded on the container in which they are packed—

Test tubes, arsenic tubes, ampoules, vaccine tubes and bulbs, glass eyes, glass cells, glass wool, microscope cover glasses and slides.

In the case of tubing and rod, the indication of origin shall either be applied in the manner set out in the second paragraph of the annex above at or near the end of each tube or rod, or shall be stamped, printed or stencilled on the wrapper surrounding the bundle or an end of the bundle, or, if there be no such wrapper, stamped, printed or stencilled on a label securely attached to the bundle.

Domestic, Fancy and Illuminated Glassware, etc.

There has also been published the report of the Committee as regards an application for the marking of domestic, fancy and illuminating glassware and glass bottles. It is recommended that the following classes and descriptions of imported glassware shall bear an indication of origin at the time of sale or exposure for sale, both wholesale and retail, in the United Kingdom: Domestic, fancy, and illuminating blown glassware of all descriptions, other than electric lamp bulbs; pressed glassware of all descriptions; bottles and jars of glass, other than containers.

The recommendation does not apply to:—Bottles, jars and other containers of glass of the types ordinarily used for the purpose of being filled with beverages, foodstuffs, drugs, chemicals, or any other goods, to be sold or exposed for sale in such containers; Christmas tree ornaments, glass beads and necklets made therefrom, buttons, imitation pearls, and appliques for dresses and similar purposes, imitation fruits and glass leaves for manufacturing purposes, lamp-blown glass spoons, such as those used for salt, small stones for use by manufacturing jewellers, glass eyes for dolls and toy animals, and glass lustres; glassware which is a component part of a composite article.

Asbestos Cement Products

The Committee also recommends that the following descriptions of imported asbestos cement products shall bear an indication of origin at the time of sale or exposure for sale, both wholesale and retail: Sheets, tiles, pipes, and other builders' materials or requisites.

Wallsend Castner-Kellner Works to Close

In continuation of their policy of concentration, Imperial Chemical Industries have decided to close down the Castner-Kellner works at Wallsend, and to transfer the plant and workers to Billingham. The Castner-Kellner Alkali Works have been in operation for many years, and have provided employment for a considerable number of men, the majority of whom, it is understood, will be transferred to Billingham.

Nitrogenous Fertilisers in Australia

I.C.I. Director's Evidence Before Australian Tariff Board

Mr. B. E. Todhunter, a director of Imperial Chemical Industries, recently gave evidence before the Australian Tariff Board, in Melbourne, with respect to nitrogen fertilisers. Mr. Todhunter's statement is given below.

AUSTRALIA, in common with other countries possessing large centres of population, is a producer of by-product ammonia from her gas works and coke ovens. The only present outlets for this product in the Commonwealth lie in the manufacture of anhydrous ammonia for refrigeration and similar purposes, and of nitrogenous fertilisers, *e.g.*, sulphate of ammonia.

The consumption of anhydrous ammonia is limited and fairly constant, and the balance has to be converted into sulphate. There is at present no other means of disposal—large quantities of ammonia cannot be allowed to run to waste without becoming a nuisance—and the manufacture of sulphate is in consequence a forced production. The quantity is dependent on the tonnage of coal carbonised, and cannot be expanded to meet increased demand or reduced in the event of a fall in prices. The manufacture of sulphate in the Commonwealth commenced about 1888, and in 1920 a duty of 15 per cent. British, 25 per cent. foreign, was placed upon competing imports. Since that date local production has been in excess of the demand.

Demand for Sulphate of Ammonia

Owing to the high price level that has been maintained, the possibility of profitable use has been confined to certain branches of agriculture, and in spite of propaganda work by the by-product producers, the increase in demand has been slow, and Australia to-day is behind most important agricultural countries in appreciating the use of nitrogen.

The present output of by-product ammonia in Australia is 5,500 long tons annually, and this figure will probably expand with the increase of population and of steel production to about 8,000 tons in ten years' time. About 800 to 900 tons of this is absorbed for anhydrous ammonia, and as the chemical industry develops a further quantity of 1,000 tons will probably be absorbed for other purposes, leaving available about 6,000 tons for conversion to sulphate, or, say, 22,000 tons of sulphate, as a maximum production in Australia from by-product ammonia.

Consumption of sulphate has now increased to a point where it roughly balances production, though owing to the coal strike it has proved necessary to supplement by-product sulphate to some extent with imports this year. In 1928 a small quantity was imported to the West, but this was about balanced by exports to New Zealand and Fiji. From now onwards it is estimated that the demand will exceed the local supply to an increasing extent, and that the requirements of Australia of sulphate or the equivalent may ultimately reach as much as 100,000 tons annually, of which only about 20 per cent. could be supplied by existing producers.

Future Possibilities

This estimate is based on two assumptions:—(1) That a systematic campaign of really educative propaganda is carried out, preferably with the assistance of the State Agricultural Authorities, but in any case Imperial Chemical Industries are prepared to undertake the work; and (2) That sulphate of ammonia is distributed to the farmer at a price which enables him to use it to economic advantage.

It may be said that an estimate of this nature requires some evidence to substantiate its accuracy. Any concrete evidence in its support is naturally difficult to supply, but the following points may reasonably claim the attention of the Board:—

Imperial Chemical Industries, of England, have established an extensive agricultural research station to deal with fertiliser problems throughout the Empire, and are spending a very substantial amount on research of this nature. The work they have done has been instrumental in expanding the market for nitrogen in other parts of the Empire and of the world to such an extent that production of these fertilisers at Imperial Chemical Industries' factories has grown from a few thousand tons after the war to 750,000 tons of sulphate, or its equivalent, in 1929. The estimate has been made by two of the company's most experienced officials, with a wide knowledge of the various branches of agriculture in different parts of the Empire—wheat growing, dairy farming, sub-tropical cultivation, etc.—after twelve months' study of Australian conditions. It does not take into consideration any possible use of nitrogen on wheat or other crops in any district with less than 20 in. rainfall, and our own experience of nitrogen development in other countries suggests that the figures are conservative. In New Zealand we have been able to attack the nitrogen problem unhampered by tariff restrictions, and assisted by lower distribution costs. We are supplying sulphate to the farmer at £12 12s. per ton ex country depots, as compared with an average Australian price of about £17, under similar conditions, and our estimated consumption for the 1929 fertiliser year in the Dominion has already been exceeded.

Position in New Zealand

The profitable use of nitrogen entails considerable knowledge on the part of the user in the application of the fertiliser, and this applies particularly to the new system of rotational grazing which is being applied in many countries, and to which particular attention is being given in New Zealand. In the Dominion, the State Agricultural Department and our own officials have been carrying on educational work on these lines for a considerable period. The country has been very receptive to new ideas, and many of the leading farmers had studied the question.

The position in Australia is less advanced, and in our view at least two years of experimental and educational work—with the co-operation of the Agricultural Departments if possible—is desirable before any adequate and permanent benefit to agriculture generally would arise from an indiscriminate cut in prices. The policy of Imperial Chemical Industries is directed ultimately to the erection of a factory and establishment of a fertiliser industry in the Commonwealth, but the economics of the question depend entirely on output and on the possibility of erecting large plant units. A small plant is not economic, and an output of at least 100,000 tons annually would be necessary to enable local manufacture to supply Australia at anything approaching world parity, after allowing for the protection afforded by freight and landing charges. A plant of this capacity involves an expenditure of the order of £2,500,000.

Suggested Sales Control

The position is not yet ripe for an undertaking of this nature, the future rate of expansion not only of the Australian but the New Zealand market requires to be determined with reasonable accuracy before expenditure of the order indicated could be incurred. In the meantime, the position of nitrogenous fertilisers has been the subject of discussions between ourselves as importers and potential manufacturers, and the principal by-product producers on the following lines:—That a common sales control for all by-product and imported sulphate should be established, and that an application should be made to the board for a rebate of duty on all British imports required in excess of local production. That the by-product makers should receive for a period a price equivalent to the imported landed cost (duty paid) for the time being; and that the selling price to the distributor should be the weighted average of the imported material (duty free, if the Government so determines), and the by-product producers' price.

If our estimates are correct and the reduction in the U.K. price, which has just been made, is taken into consideration, the price to the consumer should be immediately reduced and should continue to fall under these conditions during the next two or three years. The re-valuation of nitrogen products would then be carried out without the disturbance attending violent price fluctuations, and time would be afforded for the educational work which is essential before the market can expand sufficiently to justify the expenditure necessary for the establishment of the manufacture in Australia.

An impression exists in many quarters that nitrogenous fertilisers are competitive with superphosphate, and if sold in large quantities might affect the interests of that industry. This is not the case as regards sulphate of ammonia—the two products are complementary rather than competitive, and the

scientific use of nitrogen requires the use of larger quantities of superphosphate than are being used at present as a basic dressing. One of the first results of educational propaganda for nitrogen is to increase the demand for P_2O_5, and for lime in the wetter areas.

At the same time, it should be borne in mind that the whole of the fertiliser industry is at the moment in a transition stage, and requires very careful handling. The general tendency throughout the world is in the direction of the manufacture and sale of complete fertilisers instead of straight nitrogen and straight superphosphate. This is more in evidence in the older countries than in Australia, but the industry must inevitably tend in the same direction here, and such change will affect other products besides by-product ammonia.

Complete Fertilisers

With the increased scientific knowledge that is being applied to agriculture, fertilisers can no longer be split into separate sections with separate uses, but have to be regarded from the point of view of the industry as a whole, comprising all those products which go to make up a complete plant food. As an illustration, I may mention the new composite fertilisers, such as the ammonium phosphates, which are at present classed as nitrogenous fertilisers. While the direct value of these productions in Australia used alone is as yet undertermined, their value as mixed fertilisers is undoubted, and on account of the saving in transport which arises from their use they may prove of great value for countries such as this, where transport is of vital importance, and to some extent displace superphosphate as a source of P_2O_5. Another point on which a revaluation of nitrogen fertilisers will undoubtedly have a considerable reaction is the manufacture of organic nitrogen fertilisers by meat works and others. About 37,000 tons annually of these manures are produced at present in Australia. Their nitrogen content is comparatively low, and with sulphate at a sufficiently low price they can no longer compete as fertilisers, but are displaced and have to find a market in the form of concentrated animal foods. This tendency is already showing in many older countries where synthetic nitrogen is produced on a large scale.

While the ultimate objective must be to get fertilisers of all descriptions into the hands of the user at the lowest possible cost, we are of the opinion that the most urgent need at the moment is the scientific investigation of fertiliser problems, and the more exact determination of Australian requirements. These must vary very widely in different States, and for different purposes. At the same time this should be accompanied by a steady readjustment of prices in the direction of world parity. Whatever Australian requirements may ultimately prove to be, either in nitrogenous fertilisers or in those of the combined nitrogenous and phosphatic type, Imperial Chemical Industries will be prepared to supply either by imports or by local manufacture, and to co-operate with existing Australian fertiliser interests to any extent which may be advantageous to the country.

Affairs of Drug Merchant

At Bankruptcy Buildings, London, on Friday, August 23, the first meeting was held of the creditors of Philip Whipman, lately carrying on business at St. Dunstan's House, 8, Cross Lane, and Baker's Row, Farringdon Road, drug merchant. The receiving order was made on August 13 on the debtor's petition. His statement of affairs disclosed gross liabilities £822, of which £796 in expected to rank against net assets £100. It appeared from the debtor's statements in preliminary examination that he first started business on his own account in the drug chemical trade in 1912, and in 1914 a company was formed to take over the business in which he had been joined previously by a partner. This company was dissolved in May, 1925. Afterwards the debtor continued trading alone, until June 30, 1929, when a company was formed to take over his business as a going concern. The only assets acquired by the company were the goodwill, office furniture and his (the debtor's) services. He filed his petition owing to pressure by creditors and having no means to meet their claims. His failure was attributed to insufficient working capital, trade depression and heavy overhead charges. The estate was left in the hands of the Official Receiver.

Sulphuric Acid Catalysts

The Monsanto Product

As is natural, there has long been an effort on the part of chemists to find a substitute for platinum as a catalyst for the oxidation of sulphur dioxide in the manufacture of sulphuric acid by the contact process. The chemists of the Illinois plant of the Monsanto Chemical Works were successful a few years ago in developing complex vanadium silicates which show exceptionally high activity as catalysts for the oxidation of sulphur dioxide, and the use of which seems likely to have important results on the economics of sulphuric acid production.

The vanadium silicates are known commercially as the Monsanto Sulphuric Acid Catalyst. The catalyst shows certain advantages as compared with platinum. On the score of cost, for example, a simple calculation shows that in the best type of converter, the cost of Monsanto catalyst to handle 50,000 lb. of sulphur a day is about one-fifth of the cost of a platinum-asbestos catalytic mass. If a magnesium sulphate-platinum mass is used, as in a Schroeder-Grillo converter, the difference is even more striking, for the Monsanto catalyst costs less than one-seventh of the platinum one.

Unaffected by Poisons

As is well known, platinum contact masses are adversely affected by certain "poisons," e.g., arsenic, hydrochloric acid, etc. Such substances have no poisoning effect on Monsanto catalyst; this has been shown by trying them in large dosages in the laboratory and the plant. On this account, the Monsanto catalyst is particularly indicated for plants using sulphur dioxide gas from metallurgical roasters, where the complete removal of such impurities is costly and in some cases impossible. Of course, if dust is allowed to settle on the mass, so as to cover it up, its efficiency is impaired, but there is no poisoning.

As regards the life of the catalyst, the development is so recent that nothing definite can be stated. In several cases, however, the Monsanto catalyst has had three years' continuous service, and conversion remains entirely unaltered. A life of 10-15 years is thought highly probable.

As regards the relative activities, it is claimed that the conversion (of sulphur dioxide to trioxide) obtained with the Monsanto catalyst under any given set of conditions of temperature, apparatus, loading, etc., is identical with the most active platinum mass (in the preparation of which great care and skill are needed). The Monsanto catalyst is now operating in one of the largest sulphuric acid plants in this country. The latter may be inspected on application to the Graesser-Monsanto Chemical Works, Ltd.

German Nitrogen Fixation by the Mont-Cenis Process

The Gasverarbeitunggesellschaft m.b.H., known as "Gaveg," 60 per cent. controlled by the Mont-Cenis Co., of Solingen, Westphalia, and 40 per cent. by the State-owned Bergwerks A.G. Hibernia, is now the second largest fixed nitrogen enterprise in Germany, after the I.G. Gaveg proposes to increase production next year (1930) from 40,000 to approximately 50,000 tons of fixed nitrogen. In terms of finished products the present output represents the production of about 70,000 tons Montansaltpetre, and 120,000 tons of ammonium sulphate. In addition to these two principal products, Gaveg makes anhydrous ammonia, ammonium nitrate, etc. Gaveg operates the Mont-Cenis synthesis. The two commercial producing units of this company are located as follows: Plant I, on the Mont-Cenis coal pits in the Ruhr, and Plant II on the property of the Hibernia Coal Co.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

(135) *Alumina Silicate.*—The names and addresses are required of firms in this country who manufacture alumina silicate, used for softening water.

(136) *Micaceous Oxide.*—Inquiries have been received for the manufacturers of micaceous oxide.

From Week to Week

THE NINTH INTERNATIONAL CONGRESS of the Chemical Industry will take place in Barcelona from October 7 to 14.

MR. P. R. SCOTT, chemist in the Department of Agriculture at Victoria, Australia, has retired after 38 years' service.

MR. JAMES ALLAN, B.Sc., has been appointed to the staff of the British Dyestuffs Corporation branch of I.C.I., at Blackley, Manchester.

MR. A. HOWARD, a graduate of the Melbourne University, has been recommended as chemist on the scientific staff of the Mawson expedition to the Antarctic at the end of this year.

IMPERIAL CHEMICAL INDUSTRIES have issued a statement denying the report that their subsidiary, Synthetic Ammonia and Nitrates, Ltd., has acquired the Gray shipbuilding dock.

WHILE WORKING on the erection of a new boiler house at the works of Synthetic Ammonia and Nitrates, Ltd., Billingham, C. W. Stephens, of Norton Avenue, Norton, was fatally injured.

RECENT WILLS: Mr. Reuben A. Hepworth, of The Woodlands, Holmes Chapel, Cheshire, a director of the Carnbroe Chemical Co., Ltd., and of the Langloen Iron and Chemical Co., Ltd., left gross estate £78,833, with net personalty £77,787.

MR. W. M. DOHERTY, F.I.C., second Australian Government Analyst, department of public health, Sydney, has been appointed government analyst in succession to Dr. T. Cooksey, retired. Mr. Doherty has been associated with the state public service since 1887.

THE WORLD MARKET FOR SODA ALKALIES on the soda ash equivalency basis (58 per cent. sodium oxide) is estimated at approximately 1,000,000 tons. About 95 per cent. of these exports is divided between Great Britain, France, the United States and Germany, ranked in the order mentioned.

TO MEET the need of larger and more efficient office and laboratory accommodation, on and after August 31 Humphreys and Glasgow, Ltd., will occupy Humglas House, corner of Carlisle Place and Francis Street, Victoria, London, S.W.1. Telephones: Victoria 3961 (six lines). Telegrams: Humglas Sowest London.

MR. GEORGE WHIGHAM, the chairman of the Celanese Corporation of America, is reported as having stated that the British Celanese Co.'s production is over 12,000,000 lb. yearly, all of which is sold. The United States Tariff Committee have decided to describe rayon as synthetic textiles, thus largely overcoming the objections of the Celanese companies.

BURGOYNE BURBIDGES AND CO., LTD., of East Ham, London state that to cope with the increased demand for fine organic and inorganic chemicals and reagents, they have recently had to extend very considerably the departments set aside for their manufacture, but are now in a position to guarantee prompt delivery of all orders. They have just published a new catalogue.

AN AMALGAMATION has been arranged between the three old-established East Anglian fertiliser manufacturing companies of Joseph Fison and Co., Ltd., Packards and James Fison (Thetford), Ltd., and Prentice Bros., Ltd. The new company will trade under the title of Fison, Packard and Prentice, Ltd. The head office, to which all communications should be addressed, will be Gippeswyk Avenue, Ipswich.

BABCOCK AND WILCOX, LTD., are reported to have recently purchased 49 per cent. of the shares in the largest Polish boiler works, the Zieleniewski Fitzner Gamper Company, and to have concluded simultaneously an agreement by virtue of which all parts of Babcock and Wilcox boilers will be manufactured in Poland. The British firm, it is stated, will supply the necessary funds for the modernisation of the plant. The technical work will be carried out by local experts, but there will be British financial supervision.

THE SPANISH OUTPUT OF POTASH is understood to have increased materially in 1928. In 1927 total production amounted to 172,356 tons of potash salts, as compared with 80,598 tons in 1926. Until now Spanish potash production has been entirely from the mines of a single company, Minas de Potasa de Suria, S.A., in the Province of Barcelona. This company has, after many years of preparation, now reached large-scale production. Another company, Union Espanola de Explosivos, has been developing large deposits in the same district and expects to commence production during 1929.

THE UNITED STATES Assistant Commercial Attaché in Buenos Aires states that Imperial Chemical Industries is believed to intend to construct a modern plant in the City of Buenos Aires for the manufacture of tartaric acid. The wine manufacturers of Mendoza and San Juan use large quantities of tartaric acid annually. Imperial Chemical Industries has, he says, for some time considered the advisability of erecting a modern tartaric acid plant in Buenos Aires, but it is only recently—and only after the recommendation of a group of their experts who studied conditions in Argentina for about a year—that a decision was reached. The new plant will be controlled by the Sociedad Anonima Rivadavia. It is also understood that Imperial Chemical Industries is studying the possibility of erecting other factories in Argentina.

TWO HUNDRED AND SIXTY-NINE DOCTORATES in chemistry were conferred by universities in the United States in the session 1927–28.

DR. F. M. G. JOHNSON has been appointed director of the department of chemistry of the McGill University, Montreal, in succession to Professor R. F. Ruttan.

MR. T. KNOWLES has relinquished his post with Boots Pure Drug Co., Ltd., in order to take up an administrative sales position on the staff of the Graesser Monsanto Chemical Works, Ltd.

STEEL DRUMS used for the transport of chemicals will not, for the future, be allowed free entry into the United States without conclusive evidence that the drums are of American manufacture.

A VERDICT of "accidental death" was returned at the inquest, on Tuesday, on Professor L. H. Cooke, of the department of mine surveying at the Imperial College of Science. He died as the result of an accident while cycling.

ONLY ONE COMPANY produces sulphuric acid in Greece, employing the chamber process. Its annual output is 60,000–70,000 tons of 50 per cent. strength, of which 90 per cent. is used for making fertilisers and the remainder sold locally or exported.

SYNTHETIC COAL OIL PRODUCTS PTY., LTD., has been registered in Victoria with a capital of £50,000. The directors are Messrs. B. E. Todhunter (a director of Imperial Chemical Industries), Essington Lewis, E. H. Flack, Colin Fraser, Sir W. Lennon Raws and H. B. Howard-Smith.

AMONG AMERICAN VISITORS staying in London at present is Mr. James H. McGraw, chairman of the McGraw-Hill Publishing Co., New York, who last visited this country in 1922, and who appears to have greatly benefited in health from his holiday and the course of treatment he has undergone at a German spa.

SIR HARRY MCGOWAN, chairman of Imperial Chemical Industries, has handed to Mr. H. O. Frielinghaus, the manager of the South African cricket team, a cheque for £250 to be placed to the credit of the funds of the South African Cricket Association, in appreciation of the sporting spirit displayed by the team in their matches in England.

THE AMERICAN I.G. CHEMICAL CO. announces that it has no negotiations whatever pending for a plant in Louisiana. This denial is in answer to reports concerning negotiations expected to lead to the construction of a $20,000,000 plant by the company at Monroe, La., for the manufacture of dyes and the application of the hydrogenation process to the refining of petroleum.

THE German Patents Court of Appeals has confirmed the validty of the basic patents on silica gel, against the contentions of the I.G. Litigation involving rights in the production of silica gel has been carried on in the German courts for eight years. According to the report, the appellate court has upheld completely the claims of the Silica Gel Corporation, which is a subsidiary of the Davison Chemical Co.

AN EXTRAORDINARY GENERAL MEETING of the Lautaro Nitrate Co., Ltd., was held in London on Thursday, August 22, to adopt new articles of association, in connection with the arrangement between the Lautaro company and the Anglo-Chilean Nitrate Corporation, whereby the Guggenheim process is to be introduced into the operations of the former company. The resolution to adopt the new articles was carried by a large majority.

ROURA AND FORGAS, 14, Seething Lane, Great Tower Street, London, E.C.3, announce that they have been appointed by "Mercurio Europeo," (which owns the quicksilver mines of Minas de Almaden, Madrid, Monte Amiata S.A.M., Rome, R. Miniera di Idria, Trieste, Stabilimento Minerario Del Siele, Leghorn, and Societa Mercurifera Italiana, Rome, producing practically 90 per cent. of the world's consumption,) sole importing buyers for Great Britain, Northern Ireland, the Irish Free State, and the British Dominions of Australia, New Zealand, South Africa, and British Guiana.

THE SULPHURIC ACID PLANT owned by the Mond Nickel Co. at the Coniston smelter near Sudbury, Canada, has been acquired by Canadian Industries, Ltd., Toronto, to carry out experimental work. This involves utilisation of the fumes from the smelters of the International Nickel Co., the American Metals Co., and the Consolidated Mining and Smelting Co. in the production of sulphuric acid. The plans contemplate the ultimate treatment of 500 tons of fumes per day. Favourable outcome of the preliminary work is expected to result in the erection of a large modern sulphuric acid plant.

E. I. DU PONT DE NEMOURS AND CO., INC., has secured complete control of Lazote, Inc., through the acquisition of the necessary shares. The Lazote synthetic ammonia plant is located at Belle, W. Va., and is one of the only three in the United States manufacturing nitrogen products from the air, the other two being the plants of American Cyanamid Co. and the Atmospheric Nitrogen Co. Lazote, Inc., Wilmington, changed its name to the Du Pont Ammonia Corporation, as from August 1. The Du Pont Ammonia Corporation at the same time announced its entrance into the synthetic methanol industry.

Obituary

MR. ARTHUR COOKE, of the staff of Brunner, Mond and Co., Ltd. on Monday, August 26, at Northwich.

References to Current Literature

British

AMMONIA SYNTHESIS.—The utilisation of natural gases for the ammonia process. H. Liander. *Trans. Faraday Soc.*, August, pp. 462–472. An investigation the results of which indicate that a manufacture of the initial gases for the ammonia synthesis can with advantage be based on the utilisation of natural gases.

CATALYSIS.—An enquiry into the catalytic activity of molten tin. The relative efficiencies of tin and its oxides as catalysts for the reduction of nitrobenzene vapour. G. Williams. *Trans. Faraday Soc.*, August, pp. 446–451.

GENERAL.—Alcohol fuels for use in internal combustion engines. J. G. King and A. B. Manning. *Journal Inst. Petroleum Tech.*, June, pp. 350–368.

The thermal decomposition of paraffin wax in the presence and in the absence of hydrogen under high pressure. H. I. Waterman, T. W. de Nuyl and J. N. J. Perquin. *Journal Inst. Petroleum Tech.*, June pp. 369–371

The production of white arsenic. C. R. Paynter. *Chemical Engineering and Mining Review* (Australia), July, pp. 375–379.

Flotation of copper sulphides in the presence of primary slime. H. T. Robjohns. *Chemical Engineering and Mining Review* (Australia), July 5, pp. 379–380.

Eucalyptus oil: An Australian industry. W. E. Figgis. *Chemical Engineering and Mining Review* (Australia), July 5, pp. 391–396.

The new Sulman-Picard process for tin extraction. A. S. Fitzpatrick. *Chemical Engineering and Mining Review* (Australia), June 5, pp. 331–332.

Mining and treatment of gypsum in South Australia. L. J. Winton. *Chemical Engineering and Mining Review* (Australia), June 5, pp. 337–340. A description of works and plant of the Waratah Gypsum Pty, Ltd.

The manufacture of sugar in Australia. W. E. Figgis. *Chemical Engineering and Mining Review* (Australia), June 5, pp. 341–346.

RUBBER.—Heats of combustion of rubber, gutta-percha and balata. T. H. Messenger. *Transactions Inst. Rubber Industry*, June, pp. 71–86.

A study of the viscosity of rubber-latex. C. M. Blow. *Trans. Faraday Soc.*, August, pp. 458–462.

TEXTILES.—The comparison of the whiteness of fabrics using a cube photometer. I.—The instrument and its use. A. Adderley. II.—Theoretical.—M. O. Pelton. *J. Textile Inst.*, August, pp. T 203–217.

United States

ANALYSIS.—Determination of moisture content of coal and similar substances. M. Mannheimer. *Ind. Eng. Chem.*, July 15, pp. 154–156.

APPARATUS.—Portable detector developed for many combustible gases. J. K. Mabbs and W. B. Rowland. *Chem. Met. Eng.*, August, pp. 490–491.

Rapid-indicating continuous reading vacuum and pressure gauges. H. G. Anderson. *Ind. Eng. Chem.*, August, pp. 795–797.

CHEMICAL ENGINEERING.—How heat transmission affects fluid friction in pipes. C. S. Keevil and W. H. McAdams. *Chem. Met. Eng.*, August, pp. 464–467.

Designing flash distillation equipment for petroleum refining. R. S. Piroomov and N. E. Loomis. *Chem. Met. Eng.*, August, pp. 472–475.

FERMENTATION ALCOHOL.—Adjustment of acidity of cane-molasses fermentations for maximum alcohol yields. F. M. Hildebrandt. *Ind. Eng. Chem.*, August, pp. 779–781.

GENERAL.—Asphalt emulsion has many uses in the chemical plant. L. Kerschbraun. *Chem. Met. Eng.*, August, pp. 477–479.

Industrial Measurements, I.—Weighing. E. P. Partridge. *Ind. Eng. Chem.*, August, pp. 740–744.

Solvents for waxes. O. A. Pickett. *Ind. Eng. Chem.*, August, pp. 767–768.

Vaporisation of complex mixtures. W. J. Podbielnick and G. G. Brown. *Ind. Eng. Chem.*, August, pp. 773–779. Fundamental equations applicable to the continuous and differential vaporisation processes have been derived and checked by comparison with experimental data. The two different processes have been studied experimentally and theoretically and nine specific conclusions have been reached.

Inflammability of mixtures of ethyl alcohol, benzene, furfural and acetone. G. W. Jones and J. R. Klick. *Ind. Eng. Chem.*, August, pp. 791–793.

OILS.—Iodine numbers of lubricating oils before and after use in automobile engines. *Ind. Eng. Chem.*, August, pp. 793–794.

SYNTHETIC FERTILISERS.—Arc process is giving way to ammonia synthesis. A. Aubert. *Chem. Met. Eng.*, August, pp. 481–483.

VITAMINS.—Comparison of biological and colorimetric assays for vitamin A as applied to fish oils. E. R. Norris and I. S. Danielson. *J. Biol. Chem.*, August, pp. 469–475.

German

ANALYSIS.—Contribution to the technique of fluorescence analysis. M. Haitinger and V. Reich. *Chemische Fabrik*, August 21, pp. 379–380.

The gravimetric determination of polysulphide sulphur. P. Szeberenyi. *Zeitschrift analytische Chem.*, Vol. 78, Parts 1–2, pp. 36–40.

The methods of determination of lead peroxide. I.—A. V. Pamfilov. *Zeitschrift analytische Chem.*, Vol. 78, Parts 1–2, pp. 40–52. Deals with the iodimetric method and the thiosulphate method.

FIRE EXTINCTION.—Carbon tetrachloride as a medium for fire extinction. F. Wirth. *Chemiker-Zeitung*, August 21, pp. 651–652.

GENERAL.—The action of hydrazine on pentavalent arsenic in feebly acid solution. II.—H. Kubina. *Zeitschrift analytische Chem.*, Vol. 78, Parts 1–2, pp. 1–36.

The preparation and properties of nitryl chloride. H. J. Schumacher and G. Sprenger. *Zeitschrift analytische Chem.*, Vol. 182, Parts 1–2, pp. 139–144. Nitryl chloride, NO_2Cl, is made by the action of ozone on nitrosyl chloride; it is a colourless gas, decomposing at measurable speed at 120° C., and condensing at —15° C. and atmospheric pressure to a heavy colourless liquid.

Experiments on the activation of sulphur. R. Schwarz and P. W. Schenk. *Zeitschrift anorganische Chem.*, Vol. 182, Parts 1–2, pp. 145–157. By means of the silent electric discharge, sulphur (in the form of vapour) is activated, and after leaving the field exhibits increased capacity for reaction with carbon monoxide and hydrogen.

The preparation and properties of an oxide of bromine. B. Lewis and H. J. Schumacher. *Zeitschrift anorganische Chem.*, Vol. 182, Parts 1–2, pp. 182–186. A solid oxide of bromine, having the formula $(Br_3O_8)_n$, has been prepared by the action of ozone on bromine.

GLASS.—The limits of the softening-interval of glasses, and the abnormal alteration of specific heat and of volume in the softening region. G. Tammann and A. Kohlhaas. *Zeitschrift anorganische Chem.*, Vol. 182, Parts 1–2, pp. 49–73.

SYNTHETIC FERTILISERS.—Economic problems of the nitrogen industry. H. Grossmann. *Chemiker-Zeitung*, August 24, pp. 661–663.

WOOD PRESERVATION.—The preservation of wood. H. Kreuzkam. *Chemiker-Zeitung*, August 21, pp. 650–651.

French

ANALYSIS.—The quantitative determination of nitrogen in organic substances according to the method of Dumas. I. Marek, with M. Krajcinovic and G. Zaljesov. *Bulletin Soc. Chim. France*, June, pp. 555–560.

The quantitative determination of neon in natural gases. N. P. Péntcheff. *Comptes Rendus*, August 12, pp. 322–325.

GENERAL.—The water content of essential oils and of turpentine. Hugh Nicol. *Comptes Rendus*, August 5, pp. 289–292.

ORGANIC.—A new synthesis of tropic acid. M. Chambon. *Bulletin Soc. Chim. France*, June, pp. 524–528.

The constituion of Scholtz's base. R. Locquin and R. Heilmann. *Bulletin Soc. Chim. France*, June, pp. 553–555.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

316,113. Catalysts for the Production of Methanol and Higher Alcohols, Manufacture of. H. G. Smith and R. G. Franklin, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. Application date, April 20, 1928.

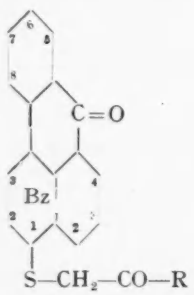
The catalyst is made by heating a metal carbonate to convert it into the oxide, which is then granulated by moistening the dry powder and agitating. The granules are then made into pellets which retain their shape and activity for long periods. Examples are given of the preparation of catalysts from basic zinc carbonate and from a mixture of zinc and chromium carbonates.

316,156. Vat Dyestuffs, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 24, 1928.

Specification No. 307,947 (see The Chemical Age, Vol. XX, p. 52) describes the production of grey to black vat dyestuffs by condensing one molecular proportion of an aromatic or heterocyclic compound containing two or more negative substituents in the nucleus with two or more molecular proportions of a nitrogenous dibenzanthrone or isodibenzanthrone or derivative containing at least one reactive hydrogen atom on the nitrogen atom. Some modifications of this process were also described. In this invention, the products obtained as above are treated with alkaline or acid condensing agent such as caustic potash, alcoholic potash, or aluminium chloride, in the presence of solvents or diluents. The products give very fast grey to black shades. Examples are given of the treatment of dyestuffs prepared from amino-dibenzanthrone and 1-chloranthraquinone or 6- or 8-chlorbenzanthrone, and others.

316,172. Condensation Products and Vat Dyestuffs of the Benzanthrone Series, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, March 24 and September 5, 1928.

These condensation products are obtained by treating with alkaline condensing agents derivatives of benzanthrones with free 2-position which are combined in the Bzl-position by a sulphur atom with a radicle of the formula R—CO—CH_2, in which R is an alkyl or aryl group which may also contain substituents. The initial materials correspond to the general formula.



The condensation products can be converted into vat dyestuffs by treating them with hydrolysing agents having acid or alkaline reaction, and simultaneously or subsequently oxidising the products. Examples are given of the treatment of acetonyl-Bzl-benzanthronyl-sulphide, phenacyl-Bzl-benzanthronyl-sulphide, and chlor-phenacyl-Bzl-benzanthronyl sulphide. The condensation products are insoluble in dilute acids, and when treated with alkalies give salt-like compounds which yield intensely coloured solutions with water, alcohol, etc.

316,309. Hydrogenation of Aldehydes. C. F. Horsley, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. Application date, June 29, 1928.

The process is for the hydrogenation of crotonaldehyde in the vapour phase, with or without steam. A suitable catalyst consists of copper and or silver, together with at least one oxide or hydroxide of the type MeO or $Me(OH)_2$ where Me is a divalent metal. A mixture of metals containing traces of oxides of the above kind may also be used, *e.g.*, mixtures of iron and silver, or iron and copper, as usually prepared by the reduction of the mixed hydroxides with hydrogen at temperatures below 300° C. Suitable oxides or hydroxides include iron, cobalt, nickel, zinc, calcium, strontium, barium, magnesium, divalent chromium, and manganese. The mixed hydroxides are first precipitated, and then reduced under such conditions that the copper and/or silver are completely reduced, while the oxide or hydroxide is incompletely reduced or not reduced. The presence of basic salts in the preparation of the catalysts is avoided by adding the mixed solutions to an alkali solution instead of vice versa.

316,422. Hydrocarbons, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 13, 1928.

Hydrocarbons of increased molecular weight have been obtained by heating mixtures of olefine and acetylene to high temperatures, but it has been found that apparatus of glass, quartz, porcelain, iron, nickel, copper, silver, and other materials causes extensive deposition of carbon and prevents the carrying out of the process on an industrial scale. It is now found that the deposition of carbon can be prevented if the heated gases come into contact only with elements of the fourth group of the periodic system such as tin, silicon, lead, carbon (graphite), or with zinc or aluminium. Alternatively, the operation can be conducted by passing the mixture of olefine and acetylene through a bath of molten tin, lead, or aluminium, or their alloys. Catalysts consisting of anhydrous chlorides of the heavy metals or aluminium may be used. The temperature may be 300°—600° C., and the pressure 50—100 atmospheres. Several examples of the treatment of mixturese of ethylene and acetylene are given.

316,428. Fertilizers, Production of. K. Gordon, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, S.W.1. Application date, July 19, 1928.

Natural phosphate is treated in a series of vessels on the counter-current principle with ammonium sulphate and sulphuric acid, so that the fresh acid reacts with material containing only a little phosphate. The solids are withdrawn from each reaction vessel and pass to the next higher reaction vessel, while the liquid is passed to the next lower reaction vessel. The reaction may be conducted above 80° C. and the precipitate of calcium sulphate converted into gypsum by cooling before filtration, to avoid the production of small crystals. The gypsum may be suspended in water and treated with ammonia and carbon dioxide to produce ammonium sulphate which is used in this process.

316,447. Calcium Hypochlorite, Manufacture of. L. Mellersh-Jackson, London. From The Mathieson Alkali Works, 250, Park Avenue, New York, U.S.A. Application date, August 18, 1928.

The object is to obtain calcium hypochlorite free from calcium chloride, which tends to make the product unstable and also renders it hygroscopic. The calcium hypochlorite product containing calcium chloride is treated with sodium hypochlorite which reacts with the calcium chloride to convert it into calcium hypochlorite, with the formation of sodium chloride. The latter does not affect the stability of calcium hypochlorite. The product is filtered and dried. The amount

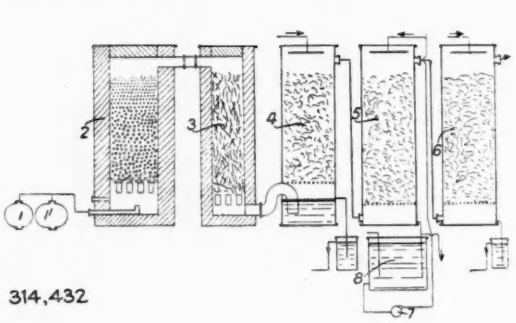
of calcium chloride in the calcium hypochlorite is first determined, and the approximately equivalent amount of sodium hypochlorite is used.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: —288,986 (I.G. Farbenindustrie Akt.-Ges.) relating to hydroxythionaphthenes, see Vol. XVIII, p. 581; 289,092 (I.G. Farbenindustrie Akt.-Ges.) relating to dyestuffs of the diaminotriphenyl-methane series, see Vol. XVIII, p. 615; 289,777 (I.G. Farbenindustrie Akt.-Ges.) relating to crotyl bromide, see Vol. XIX, p. 11; 289,807 (I.G. Farbenindustrie Akt.-Ges.) relating to dyestuffs of the anthraquinone series, see Vol. XIX, p. 11; 292,595 (I.G. Farbenindustrie Akt.-Ges.) relating to condensation products from urea, thiourea, etc., and an alcohol or ketone, see Vol. XIX, p. 173; 296,006 (Soc. of Chemical Industry in Basle) relating to amino-alkyl-arylcarbinols or N-alkylamino-alkylaryl-carbinols, see Vol. XIX, p. 419; 296,761 (I.G. Farbenindustrie Akt.-Ges.) relating to sulphur-containing hydroxy-quinones, see Vol. XIX, p. 466; 297,002 (Soc. of Chemical Industry in Basle) relating to vat dyestuffs and intermediates, see Vol. XIX, p. 496; 301,808 (I.G. Farbenindustrie Akt.-Ges.) relating to 4-(β-oxyethylamino)-1-oxybenzene, see Vol. XX, p. 159; 304,744 (I.G. Farbenindustrie Akt.-Ges.) relating to azo dyestuffs, see Vol. XX, p. 320; 305,092 (Accumulatoren Fabrik Akt.-Ges.) relating to pure hydroxides of the heavy metals, see Vol. XX, p. 340; 305,201 (Vanadium Corporation of America) relating to vanadium alloys, see Vol. XX, p. 39 (Metallurgical Section); 306,442 (Selden Co.) relating to catalytic apparatus, see Vol. XX, p. 412.

International Specifications Not Yet Accepted

314,432. NITROGEN, HYDROGEN, AMMONIA AND METHANOL. Compagnie de Bethune, Bully-les-Mines, Pas-de-Calais, France. International Convention date, June 27, 1928.

The residual gases obtained after hydrogen has been separated from coke oven gas are mixed with air and subjected to flameless incomplete combustion in a tower filled with



314,432

refractory material at a high temperature. The mixture then contains nitrogen, hydrogen and carbon monoxide. The incomplete combustion takes place in a tower 2, the formation of oxides of nitrogen being prevented by keeping the proportion of carbon dioxide in the issuing gases below a certain maximum. Traces of unsaturated hydrocarbons are removed in a tower 3 by catalytic destruction in the presence of iron, nickel or chromium. The gases are cooled in a water scrubber 4, and carbon dioxide is removed by means of ammonia solution in a scrubber 5. The solution is continuously circulated from a vessel 8. The gases are finally purified in another water scrubber 6, and are mixed with hydrogen for the synthesis of ammonia.

314,443. UREA. A. B. Lamb, Harvard College, Cambridge, Mass., U.S.A. (Assignee of H. J. Krase and H. C. Hetherington, Washington, U.S.A.) International Convention date, June 27, 1928.

Carbon dioxide and ammonia, or compounds derived from them such as ammonium carbonate or carbonate are heated in the presence of excess of ammonia to 120° C.-200° C. in an autoclave to obtain urea. The uncombined ammonia is distilled off at a lower temperature and used again, and the urea is recovered from the mixture.

314,448. SYNTHETIC DRUGS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 27, 1928.

p-Acetoxy-propiophenone is brominated in glacial acetic acid and the product treated with methylamine or methylbenzylamine, yielding *p*-oxymethyl-aminopropiophenone or *p*-oxymethyl-benzyl-aminopropiophenone. These are subjected to catalytic hydrogenation to obtain α-*p*-oxyphenyl-β-methylamino-propanol ($OH.C_6H_4.CHOH.CH(CH_3).NHCH_3$). The same product can be obtained by diazotizing *p*-aminophenyl-β-methylamino-propanol and heating the diazo solution. Examples of the two methods are given.

314,524. SYNTHETIC RUBBER. J. Baer, 4, Schanzenstrasse, Basle, Switzerland. International Convention date, June 29, 1928.

Isoprene dibromide or butadiene dichloride is heated with solutions of alkali or alkaline earth sulphides or polysulphides to obtain products resembling caoutchouc.

314,526. ZIRCONIUM OXIDE. A. Karl, Villa Mont-Louis, Chemin de Palama, Chateau-Gombert, Marseilles. International Convention date, June 30, 1928.

An alkali zirconate is brought into solution as sulphate and the hydroxide precipitated by hydrolysis in neutral solution. The solution may first be reduced with a powerful reducing agent to prevent simultaneous precipitation of impurities such as iron, titanium or aluminium.

314,527. DYES AND INTERMEDIATES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 29, 1928.

A 2 : 2¹-dithionaphthenyl-ketone-3-carboxylic or 3 : 3¹-dicarboxylic acid is heated with an agent which removes water, and then heated with or without aluminium chloride for the removal of carbon dioxide, if necessary with a flux.

In an example, *o*-mercapto-benzoyl-formic acid is condensed with symmetrical dichloracetone to obtain 2 : 2¹-dithionaphthenyl-ketone-3 : 3¹-dicarboxylic acid, which is heated with acetic acid to obtain the intermediate product. The latter is then converted into dithionaphthenylene-quinone, which gives golden yellow shades on wool. Several other examples are given.

314,542. TRI-SUBSTITUTED THIOUREAS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 30, 1928.

These compounds are obtained by splitting off hydrogen sulphide from a secondary amine salt of a dithiocarbamic acid derived from a primary amine, or by treating a salt of a dithiocarbamic acid monosubstituted on the nitrogen atom with another salt of a secondary amine, and splitting off hydrogen sulphide. In an example, sodium dithiocarbamate is obtained from carbon dioxide, methylamine and sodium hydroxide, and boiled with dimethylamine hydrochloride to obtain trimethyl-thiourea. Other examples describe the production of N-phenyl-N¹-dimethyl-thiourea, dimethylbutyl, and dibutylphenyl-thiourea.

LATEST NOTIFICATIONS.

317,391. Manufacture and production of oils which are soluble in mineral oils from castor oil. I.G. Farbenindustrie Akt.-Ges. August 15, 1928.

317,396. Method of making sulphur trioxide. Calco Chemical Co., Inc. August 15, 1928.

317,437. Hypochlorite compositions. Mathieson Alkali Works. August 16, 1928.

317,471. Refrigeration apparatus. Silica Gel Corporation. August 18, 1928.

317,323. Manufacture of disazo dyestuffs. I.G. Farbenindustrie Akt.-Ges. August 13, 1928.

317,325. Manufacture of basic products. I.G. Farbenindustrie Akt.-Ges. August 13, 1928.

317,327. Anæsthetics. I.G. Farbenindustrie Akt.-Ges. August 13, 1928.

317,333. Process for the manufacture of dischargeable dyeings on acetate silk. I.G. Farbenindustrie Akt.-Ges. August 13, 1928.

Specifications Accepted with Date of Application

284,703. Distillation of tar. Barrett Co. February 5, 1927.
288,629. 2-halogen derivatives of pyridine, Manufacture of. Schering-Kahlbaum Akt.-Ges. April 14, 1927.
288,213. Acetaldehyde, Manufacture of. Consortium für Elektro-Chemische Industrie Ges. April 4, 1927.
290,174. Titanium compounds, Manufacture of. I.G. Farbenindustrie Akt.-Ges. May 6, 1927.
290,175. Hydrogenation of the homologues of aniline and mono-amino compounds of aromatic hydrocarbons containing condensed benzene nuclei, Process for. I.G. Farbenindustrie Akt.-Ges. May 7, 1927.
291,079. Sublimed white lead, Production of. J. D. McLachlan. May 28, 1927.
294,883. Azo-dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. July 30, 1927. Addition to 202,984.
299,019. Hydrocyanic acid, Production of. California Cyanide Co., Inc. October 19, 1927.
299,319. Chloracetaldehyde, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 22, 1927.
299,375. Electrolytic extraction of metals. Soc. Anon. Le Nickel. April 13, 1927.
299,425. Synthetic production of benzene and derived hydrocarbons. J. Ylla-Conte. October 26, 1927.
300,632. Nitrates of the alkalies and alkaline earths, Production of. Kali-Industrie Akt.-Ges., C. T. Thorssell and A. Kristensson. November 18, 1927.
302,148. Complete fertilizer, Production of. Chemieverfahren Ges. December 10, 1927.
305,197. Resistance to corrosion of magnesium and magnesium alloys, Process of improving. I.G. Farbenindustrie Akt.-Ges. February 2, 1928. Addition to 287,450.
316,898. Effecting gaseous dehydrating reactions. T. Ewan, H. R. Roberts and Imperial Chemical Industries, Ltd. March 5, 1928.
316,919. Hydrogen peroxide, Manufacture of—by cathodic reduction of oxygen. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 4, 1928.
316,962. 1-Amino-carbazole and derivatives thereof, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 7, 1928.
316,989. Basic derivatives of anthraquinone, Manufacture of. British Celanese, Ltd., G. H. Ellis and H. C. Olpin. April 30, 1928.
317,031. Potassium, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 9, 1928.
317,121. Substance containing silver chloride in the colloidal state, Process for the manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges*) May 10, 1928.
317,137. Electrolytic deposition of chromium. C. H. R. Gower and S. O'Brien and Partners, Ltd. May 15, 1928.
317,139. Sulphur dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 15, 1928.
317,165. Carbon and hydrogen chloride, Production of. R. M. Winter and Imperial Chemical Industries, Ltd. June 9, 1928.
317,168. Nitric acid, Method of and apparatus for concentrating. A. K. Croad. (*Chemical Construction Co.*) June 11, 1928.
317,180. Refining metals and alloys, Method of. S. Westberg. June 25, 1928.
317,194. Ketones, Manufacture of. Boot's Pure Drug Co., Ltd., and J. Marshall. July 6, 1928.
317,233. Calcium hypochlorite, Manufacture of. L. Mellersh-Jackson. (*Mathieson Alkali Works.*) August 18, 1928.
317,259. Aluminium chloride free from iron, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) October 24, 1928.

Applications for Patents

Alumina Co., Ltd., and Robinson, M.B. Manufacture of sulphate of alumina, etc. 25,689. August 23.
Brightman, R., and Imperial Chemical Industries, Ltd. Azo dyes, etc. 25,471. August 21.
British Celanese, Ltd., and Oxley, H. F. Production of organic compounds containing oxygen. 25,647. August 22.
British Celanese, Ltd., and Oxley, H. F. Production of oxygenated organic compounds. 25,648. August 22. (February 22.)
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of mon-oxamic acids. 25,394. August 20.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of vat and sulphur dyestuff preparations. 25,514. August 21.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of amino-compounds of the cyclohexylbenzene series. 25,515. August 21.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products containing sulphur. 25,841. August 24.
Dreyfus, H. Manufacture of aliphatic compounds. 25,237. August 19.
Dreyfus, H. Manufacture of oxygen-containing organic compounds. 25,238, 25,239. August 19.
Fletcher, W. B., Imperical Chemical Industries, Ltd., McAulay, J., and Wheeler, T. S. Production of carbon disulphide. 25,437 August 21.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Polymerisation of diolefines. 25,287, 25,288. August 19.
I.G. Farbenindustrie and Johnson, J. Y. Manufacture of anthraquinone, etc. 25,289. August 19.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of yellow dyestuffs. 25,290. August 19.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of nitrogenous vat dyestuffs. 25,393. August 20. (October 15, 1928.)
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of anthraquinone carboxylic acid. 25,475. August 21. (April 11.)
I.G. Farbenindustrie Akt.-Ges and Johnson, J. Y. Preparation of lacquered wire cloth, etc. 25,612. August 22.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for purification of gases. 25,720. August 23.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of phosphoric acid and hydrogen. 25,836. August 24.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Process for improving fibrous materials. 25,837. August 24.
I.G. Farbenindustrie Akt.-Ges. Suppresing phosgen formation when extinguishing fires. 25,261. August 19. (Germany, September 20, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of non-dyeing thio, derivatives of phenols. 25,284. August 19.
I.G. Farbenindustrie Akt.-Ges. Kinematograph apparatus. 25,371. August 20. (Germany, August 20, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of coloured lakes, etc. 25,622. August 22.
Imperial Chemical Industries, Ltd., Rodd, E. H., and Sharp, F. L. Triarylmethane dyes. 25,292. August 19.
Imperial Chemical Industries, Ltd. Treatment of hydrocarbons. 25,438. August 21.
Imperial Chemical Industries, Ltd. Recovery of mercury. 25,439. August 21.
Monsanto Chemical Works and Patts, H. E. Manufacture of benzoic acid. 25,429. August 21.
Naamlooze Vennootschap Fabriek van Chemische Producten. Manufacture of esterified acetyl-nitrocellulose. 25,485. August 21. (Holland, August 24, 1928.)
Naamlooze Vennootschap Fabriek van Chemische Producten. Manufacture of artificial silk. 25,486. August 21. (Holland, August 24, 1928.)
Scottish Dyes, Ltd., and Thomas, J. Production of dyestuffs. 25,760. August 23.
Soc. of Chemical Industry in Basle. Pigments, etc. 25,372. August 20. (Switzerland, August 21, 1928.)
Thauss, A. Manufacture of non-dyeing thio derivatives of phenols. 25,284. August 19.

Progress of British Bemberg

EXCELLENT progress is being made in the building of the new artificial silk factory at Wheatley Park, Doncaster, for British Bemberg, Ltd., which will provide an entirely new industry for the town. The present buildings are designed for plant which will give employment to 1,500 operatives, and it is hoped they will be ready for the installation of machinery by the end of the year, and that the factory will be complete and in working order by April or May next. The company has acquired 77½ acres of land at Wheatley. A chemical building, spinning rooms, and general offices are now being erected. An ample water supply, necessary to the process of manufacture, is assured. The cuprammonium process of manufacture will be used. A certain proportion of skilled employees from Germany, who know the process, will be engaged in the factory and will train the workers. The intention is that the enterprise shall be a British concern under British management, and employing British labour.

Indian Market for Pharmaceuticals

THERE appears to be a fair market in India for pharmaceutical products which will probably increase in extent in future years. It is not as susceptible to development, however, as one might expect from the tremendous population of the country. The tropical climate of India and the prevailing insanitary conditions necessitate the use of large quantities of germicides and antiseptics, and the enervating effects of the climate also increase the prevalence of many diseases. Because of these conditions, it is of the utmost importance continually to use external cleansing preparations, and such preparations are reported to have wide sales. Malarial and dengue fevers create a large market for fever preventatives. Dysentery, diarrhœa, cholera, and other complaints are numerous and call for medicines prescribed by a physician.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¾d. to 8d. per lb Crude 60's, 2s. 2d. to 2s. 5d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 4s. 6d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 2s. 2d. per gall. Dark, 1s. 6d. to 1s. 7d. Refined, 2s. 7d. to 2s. 10d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. per gall. Firm. Pure, 2s. 1d. to 2s. 3d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6½d. to 6¾d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2¼d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8d¼. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 45s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—£2 17s. 2d. per cwt., in ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

p-CRESOL 32/34° C.—1s. 11d. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5¾d. per lb.

LAMP BLACK.—£30 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 0½d. to 2s. 1d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—10½d. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 5d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—8s. 9d. per lb.
BISMUTH CITRATE.—8s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 3d. per lb.
BISMUTH SUBNITRATE.—7s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.
BISMUTH OXIDE.—11s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 3d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7¾d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb, in 1-cwt. lots.
CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 21s. per lb. net; Synthetic, 12s. to 14s. per lb.; Synthetic detached crystals 12s. to 16s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 2½d. per lb.
PHENAZONE.—5s. 10d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—102s. to 104s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 5d. per lb. Crystal, 2s. 3d. to 2s. 6d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—17s. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—14s. per lb.
COUMARIN.—8s. 9d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—12s. per lb.
GERANIOL (PALMAROSA).—21s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—14s. 3d. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—56s. per lb.
SAFROL.—2s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—15s. to 17s. 6d. per lb. Ex Guaiacol, 13s. 6d. to 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—3s. 9d. per lb.
BERGAMOT OIL.—16s. 6d. per lb.
BOURBON GERANIUM OIL.—22s. per lb.
CANANGA OIL, JAVA.—11s. 6d. per lb.
CASSIA OIL, 80/85%.—6s. 3d. per lb.
CINNAMON OIL LEAF.—7s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 4d. per lb.
CLOVE OIL (90/92%).—9s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 16s. per lb.
LEMON OIL.—17s. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—18s. 3d. per lb.
OTTO OF ROSE OIL.—Anatolian, 70s. per oz. Bulgarian, 110s. per oz.
PALMA ROSA OIL.—12s. 3d. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 16s. per lb.; Japanese, 7s. per lb.
PETITGRAIN.—8s. 9d. per lb.
SANDALWOOD.—Mysore, 32s. per lb.: 90/95%. 19s. per lb

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, August 29, 1929.

THERE has been rather more business coming to hand during the past week, and prices are firm and unchanged. Export business continues to improve.

General Chemicals

ACETONE.—Quite a steady demand is coming to hand, with the market continuing firm at £75 to £85 per ton.

ACETIC ACID is in brisk demand, and supplies are now available in larger quantities. Prices continue firm at £36 10s. per ton, 80% technical quality.

ACID CITRIC.—A brisk demand is on the market with the price firm at 2s. 2d. to 2s. 3d. per lb.

ACID FORMIC is in steady request, and the price, at £41 to £42 per ton for 85%, is in buyer's favour.

ACID LACTIC.—A satisfactory business is passing, with prices firm at £43 per ton for 50% by weight standard, pale quality.

ACID TARTARIC.—Demand is active and the market continues firm at 1s. 5d. per lb., less 5%.

ALUMINA SULPHATE is in rather good demand at the unchanged firm rates of £7 15s. to £8 per ton.

ARSENIC is slow of sale, with the price unchanged at £16 5s. per ton free on rails at mines, at which figure it is in buyer's favour.

BARIUM CHLORIDE continues in active demand, with supplies coming to hand more freely. These, however, are eagerly sought after, and there is very little quantity free for early delivery. The market continues at £12 to £12 10s. per ton.

CREAM OF TARTAR.—Steady conditions continue, and the price is unchanged at £100 to £105 per ton for 98/100% B.P. quality.

COPPER SULPHATE is in rather better request, and the product is now firmer at £26 10s. to £27 per ton.

FORMALDEHYDE.—A satisfactory demand is being received, and the price favours buyers at about £38 per ton.

LEAD ACETATE continues firm at £43 10s. for white and £42 10s. for brown, with demand improving.

LEAD NITRATE.—Steady at £33 15s.

LIME ACETATE.—Unchanged at £18 per ton, with improved demand.

LITHOPONE.—There is a steady business passing at £19 15s. to £23 per ton, according to quality and quantity.

METHYL ACETONE.—Steady at £58 to £60 per ton, with demand fair.

POTASSIUM CHLORATE.—Active and firm at £28 to £30 per ton.

POTASSIUM PERMANGANATE.—In good request at 5¼d. to 5¾d. per lb.

POTASSIUM PRUSSIATE.—The market is unchanged at £63 10s. to £65 10s. per ton, according to quantity, and there is a fair demand.

SODIUM ACETATE CRYSTALS.—The market continues firm at £22 10s. to £23 per ton, with standard first-class crystals still in rather short supply.

SODIUM BICHROMATE.—Steady and in fair request at 3⅜d. per lb. with discount for a large quantity.

SODIUM HYPOSULPHITE PHOTOGRAPHIC CRYSTALS.—Demand has been brisk, with prices unchanged at £14 10s. to £15 per ton.

SODIUM NITRITE.—Firm, with the product in better request at £20 per ton.

SODIUM PHOSPHATE.—Rather more business is passing in dibasic at £12 per ton, and there is no change in the price of tribasic at £16 10s.

SODA PRUSSIATE.—Continues in good request at 4½d. to 5½d. per lb., according to quantity.

TARTAR EMETIC.—Slightly firmer at 11¼d. per lb., with a fair demand.

ZINC SULPHATE.—In good request at £12 per ton.

Coal Tar Products

There is little change in the coal tar products market, and while there is not a great deal of business moving, limited supplies are available.

MOTOR BENZOL is unchanged, at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is quoted at about 1s. 2½d. to 1s. 3d. per gallon f.o.r.

HEAVY NAPHTHA remains at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL is unchanged at 3½d. to 4d. per gallon on rails in the North, and at 4¾d. per gallon in London.

NAPHTHALENES remain firm, at about £4 10s. per ton for the firelighter quality, at £5 per ton for the 74/76 quality, and at £6 to £6 5s. per ton for the 76/78 quality.

PITCH is being quoted at up to 45s. per ton, f.o.b. East Coast port but little business has been done.

Nitrogen Products

Sulphate of Ammonia.—Only small sales of sulphate of ammonia have been reported during the past week. It is understood that the price for these transactions was about £8 15s. 9d. per ton f.o.b U.K. port, in single bags for neutral quality 20·6% nitrogen. There is very little interest for forward positions.

Home.—Sales in the home market continue small, because the prices have not been announced beyond the end of September.

Nitrate of Soda.—It is understood that some bookings have been made for forward positions in the home market at the price scale already announced.

Latest Oil Prices

LONDON, August 28.—LINSEED OIL was in fair request at 5s. decline for near. Spot, ex mill, £37 10s.; September, £35 10s.; September-December and January-April, £35 7s. 6d., naked. RAPE OIL was firm. Crude, extracted, £43; technical refined, £44 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £33 10s.; refined common edible, £38; and deodorised, £40, naked, ex mill. TURPENTINE was inactive. American, spot, 43s.; September-December, 42s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot and August, £36 17s. 6d.; September, £36 10s.; September-December, £36 7s. 6d.; January-April, £35 10s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £33; November-December (new), £28 15s.; edible refined, spot, £36; technical, spot, £35 15s.; deodorised, spot, £38 per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £34 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £37; deodorised, spot, £41 per ton. SOYA OIL.—Extracted, spot, and crushed, spot, £35; deodorised, spot, £38 10s. per ton. RAPE OIL.—Crushed-extracted, spot, £42; refined, spot, £44 per ton, net cash terms, ex mill. TURPENTINE, CASTOR OIL and COD OIL unaltered.

Cyanamide Autumn Price

Cyanamide containing 20·6 per cent. nitrogen and packed in about 2 cwt. bags, is supplied in 4-ton lots carriage paid to any station in Great Britain for autumn delivery at the following prices:—August, £8 10s. per ton; September, £8 12s.; October, £8 14s.; November, £8 16s. 6d.; December, £8 19s. 6d. For lots of less than four tons, but not less than two tons, 5s. per ton additional; for lots of less than two tons but not less than one ton, 10s. per ton additional.

South Wales By-Products

SOUTH WALES by-product activities remain unchanged. Pitch producers, with hopes of heavy autumn export requirements, are holding firmly to the quotations of 45s. to 47s. per ton f.o.b., and 47s. to 50s. per ton delivered. Buying is slow, patent fuel manufacturers apparently being determined to hold off until the last minute. Road tar is unchanged with quotations at from 10s. 6d. to 13s. 6d. per 40-gallon barrel, while crude tar remains slow on a price basis of 26s. to 30s. per ton. Creosote maintains its slight improvement, but benzol and naphthas remain weak. Refined tars have a steady call, with values in coke oven and gasworks tar unchanged. Patent fuel and coke exports continue to expand and manufacturers of patent fuel are anticipating a big volume of autumn business. Patent fuel quotations are:—Ex-ship Cardiff, 21s. to 21s. 6d.; ex-ship Swansea, 20s. to 20s. 6d. per ton. Coke quotations are:—Furnace, 21s. to 22s.; good foundry, 26s. 6d. to 32s., and best foundry from 32s. 6d. to 36s. 6d. per ton.

New Nitrate Prices for U.S.A.

THE Chilean Nitrate Producers' Association have decided on the following prices per quintal of nitrate for the United States:—August 16–31, 15s. 6d.; September 1–15, 15s. 7d.; September 16–30, 15s. 8d.; October 1–15, 15s. 9d.; October 16–31, 15s. 10s.; November 1–15, 15s. 11d.; November 16–30, 16s.; December 1–15, 16s. 1d.; December 16–31, 16s. 1½d.; January 1, 1930, 16s. 2d. These prices will apply to the United States and other consuming centres agreed upon by the Association, with the exception of European and Mediterranean countries, as quotations in those areas will be continued on a c.i.f. basis. It is understood that the c.i.f. prices were agreed upon, but would not be made public. As prices f.a.s. for shipment to the United States during the past nitrate year ranged from 16s. 4d. to 16s. 7d., it will be seen that the present prices represent a substantial reduction.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, August 28, 1929.

DURING the past week there has been marked activity in the heavy chemical market, particularly in regard to solvents, and good inquiry has been received for both home and export consumption. There is no appreciable difference in prices to record.

Industrial Chemicals

ACETONE.—B.G.S. £76 10s. to £85 per ton ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. Ports; 80% pure, £37 10s. per ton ex wharf; 80% technical, £37 10s. per ton ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC ICE CRYSTALS.—In good demand and price increased about 6¾d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5% ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality, £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier and now quoted £34 per ton, c.i.f. U.K. ports. Spot material on offer at about £38 10s. per ton, ex store.

ARSENIC, WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted £10 10s. per ton, c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex store.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer at about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅛d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £36 10s. per ton, ex store. Offered from the Continent at £25 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. Crystals.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and 70/75%, £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅞d. per lb., delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality £10 13s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, with usual extras for smaller quantities and refined qualities.

SODIUM PRUSSIATE.—Spot material on offer at 5½d. per lb., ex store. Quoted 5⅜d. per lb., ex wharf to go forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption:—Solid 60/62%, £9 per ton; broken, 60/63%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted at £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small quantities

Production of Acetic Acid in Germany

THE following data relating to the production of acetic acid and covering the years 1924–1928 are derived from German official statistics:

YEAR (Oct. 1–Sept. 30).	PLANTS: Total	Inactive.	PRODUCTION (In terms of anhydrous acid Metric tons. Taxed.	Tax free. Denatured.	Not Denatured.
1924–25	21	5	4,965	73	13,367
1925–26	18	6	4,123	21	14,864
1926–27	17	5	4,477	8	20,423
1927–28	16	4	3,985	6	23,239

Of the 16 plants shown in the above table, four were inactive during the year 1928–29. Of the remaining 12 plants, two produced only negligible quantities of the acid as a by-product, and two others produced calcium acetate which was delivered to other plants for further manufacture. The quantity produced in 1927–28 represents the output of eight plants. Of these, five plants employed acetate salts and the remaining three carbide. Exports of commercial acetic acid, glacial acetic acid and concentrated acetic acid amounted to the following quantities: 1924–1925, 6,677 metric tons; 1925–1926, 6,969 metric tons; 1926–1927, 8,750 metric tons, and 1927–1928, 9,526 metric tons. The principal destinations were Great Britain and the Netherlands.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, August 29, 1929.

Conditions in the textile finishing and allied industries are now pretty well normal again, following upon the settlement of the dispute in the cotton mills, and, allowing for seasonal influences, they are taking fair deliveries of heavy chemical products. The holidays in the Lancashire industrial towns officially come to an end next week, and this should make for renewed steadiness in the chemical trade. There is a moderate inquiry about here, mainly for early delivery, and prices generally are well held.

Heavy Chemicals

In the case of sulphide of sodium there is a quiet demand about, with the commercial material on offer at round £7 12s. 6d. per ton and the 60-65% concentrated at £9. Prussiate of soda is selling in fairly regular quantities and quotations in this section are steady at from 4¾d. to 5¼d. per lb., according to quantity. A moderate business is going through in bichromate of soda, offers of which are well held on a basis of 3⅝d. per lb. Inquiry for chlorate of soda this week has been on rather quiet lines, with values ranging from about 2½d. to 2¾d. per lb. Hyposulphite of soda is reasonably steady, although only in moderate request at the moment; the photographic quality is selling at from £15 per ton upwards and the commercial at about £9. Bicarbonate of soda is firm at £10 10s. per ton, and the demand is about maintained at its recent level. With regard to caustic soda, sales of this material are fairly active and prices are unchanged on a contract basis of £12 15s. to £14 per ton. Similar conditions obtain in respect of alkali, current offers of which are at round £6 per ton. There is a moderate business going through in the case of saltcake, and prices are steady at up to £2 15s. per ton. Phosphate of soda is in fair request, with supplies obtainable this week at from about £11 to £11 10s. per ton.

Among the potash products, chlorate meets with a quietly steady demand, with current offers in the neighbourhood of 3d. per lb. The selling movement in the case of yellow prussiate of potash is on a fairly satisfactory scale and quotations are firm at from 6¾d. to 7¼d. per lb., according to quantity. With regard to permanganate of potash, a moderate business is passing in this section, with the B.P. grade quoted at about 5½d. per lb. and the commercial at 5¼d. Carbonate of potash is steady at £25 5s. per ton, ex store, for the 96-98% quality, and a fair trade is being done. Caustic potash is in quietly steady demand, with current offers at from £32 per ton, upwards. Bichromate of potash is well held at 4½d. per lb. and buying interest in this material keeps up.

A moderate movement of arsenic is reported, and prices are steady at about £16 per ton at the mines for white powdered, Cornish makes. Sulphate of copper is maintained at from £26 10s. to £27 per ton, f.o.b., although business this week has only been moderate. Nitrate of lead is in quiet demand at £34 per ton, as are also white and brown acetates of lead at £40 and £39 per ton. Only a relatively quiet trade is reported in the case of the acetates of lime, but the fact that supplies are not excessive serves to keep prices up at about £16 10s. per ton for the grey quality and £8 for the brown.

Acids and Tar Products

There is a fair demand about for tartaric acid and values are well held at round 1s. 4¾d. per lb. Citric acid is on the quiet side, and at about 2s. 1d. per lb. prices are not too firm. Acetic acid is in steady request and offers are fully maintained at £67 per ton for the glacial quality and about £36 for the 80% commercial kind. Oxalic acid is steady at £1 13s. per cwt., ex store, and a moderate business is being done.

Pitch is attracting some attention on export account and prices are held at the fixed level of £2 5s. per ton, f.o.b. Creosote oil is on offer at 3d. to 3½d. per gallon, naked, but the demand is still comparatively slow. Solvent naphtha is steady and round 1s. 2½d. per gallon, and a moderate inquiry is reported. Carbolic acid, both crude and crystal, continues to meet with an active demand, and with available supplies short, prices are firm at about 2s. 3d. per gallon, naked, for crude 60's, and 8d. per lb., f.o.b., for crystals.

Company News

Staveley Coal and Iron Co.—A final dividend of 6d. per share is recommended, making 5 per cent., free of tax, for the year ended June 30 last.

North Broken Hill Co.—A cable from Melbourne states that dividend No. 79 of 2s. and a bonus of 1s., making a total of 3s. per share, less income tax, have been declared payable on September 30.

F. Steiner and Co.—After providing £50,686, or some £5,000 less, for repairs and depreciation, there is a deficit of £13,574 for the past twelve months, as compared with a profit of £76,633 for 1927–28. To meet this debit balance a sum of £30,000 is transferred from revenue reserve, reducing that fund to £80,000, and after providing for interest and preference dividend £13,717 is carried forward, against £37,792. Last year 4 per cent. was paid on the ordinary shares.

Broken Hill Proprietary Co.—The net profits for the year ended May 31 were £332,670, after providing £317,592 for ordinary depreciation, £100,000 for special depreciation, and £81,094 for debenture interest. Two dividends of 1s. per share absorbed £268,770, the £100,000 for special depreciation and £200,000 transferred from appropriation account were applied towards writing down the coke oven plant. After provision for outstanding liabilities, there remain liquid assets in cash and other convertible stocks of £791,816. This does not include interests in other companies, but is inclusive of reserve and insurance funds.

United Indigo and Chemical Co.—A reduction in net profits from £21,067 for the previous year to £17,822 for the twelve months ended June 30 last is announced by the directors. The fixed dividend of 5 per cent. on the preference shares absorbs £7,500, and a participating dividend of 2½ per cent. takes a further £3,750, whereas a year ago the preference received an extra dividend of 3¾ per cent., which accounted for £5,625. This year the ordinaries receive a total of 7½ per cent., taking £6,561, in contrast with 8¾ per cent. last year, which disposed of £7,656, a balance of £15,578 going forward, as compared with £15,568 brought in. The annual meeting will be held in Manchester on September 4 at 11 a.m.

Veno Drug Co. (1925).—The profits brought in from trading and general income, etc., for the fourteen months ended March 31, 1929, after providing for all administration and management expenses, amount to £84,683, as compared with £90,442, for the twelve months to January 31, 1928. After allowing £26,041 for taxation and provision therefor there remains £58,641, which, with £3,443 brought forward, makes £62,084. Dividends on the 8 per cent. cumulative preference shares for fourteen months absorb £22,400, and on the 12 per cent. cumulative preferred ordinary shares for fourteen months £30,800, while £5,500 has been written off preliminary expenses, leaving £3,384, which the directors recommend be carried forward. The whole of the preliminary expenses have now been written off—£5,500 out of the profit for the period ended March 31, 1929, and the balance of £20,000 out of the special reserve which has been set aside out of profits since the formation of the company. The deferred ordinary shares again receive no dividend, the previous distribution having been 25 per cent., less tax, for 1926–27.

Japan's New Ammonium Sulphate Process

The Showa Fertiliser Co., the name of the new Japanese ammonium merger, is expected to use in its production of sulphate of ammonia the Shibata patent owned by the Department of Commerce and Industry. It is estimated that this process will enable the company to produce a ton of ammonia at a cost of 60 yen, thus effecting considerable savings in eliminating royalty to foreign owners of existing patents. It is stated that this decision was reached after an exhaustive study of various well-known processes in Germany and Italy by the executive director of the company. Because of this decision the company will forfeit 150,000 yen, which had been put up for the Japan rights of the Uhde patent, and it will not accept the proposal of the Fauser patent owners for a joint Japan enterprise, using that patent. The company expects to manufacture 50,000 tons of ammonium sulphate next year, followed by an annual production of 100,000 tons.

Salt Manufacture in India

(From Our Indian Correspondent.)

The Government of India have reconsidered their attitude to the Indian salt industry and have decided to ask the Tariff Board to report whether it is desirable in the national interest that steps should be taken to encourage the production of salt in India suitable for consumption in those markets which are at present largely supplied from abroad and if so to recommend measures. It may be recalled that the Taxation Inquiry Committee reported in 1926 that it was desirable to make India self-supporting in the matter of salt supply by encouraging local manufacturers either by way of a rebate of duty or of a differential duty on import or both. But the Government got the question examined by a special officer, and on his report came then to the opinion that no reference to the Tariff Board was necessary. Recently the Finance Member visited Karachi, the main source of supply, and as a result the Government have reconsidered the position.

The Government Scheme

The investigations conducted at Karachi by the Finance Member were not directed only to the examination of a general case for a Tariff Board inquiry. It was necessary also to consider in particular what practical steps could be taken so as to ensure that the area suitable for salt production at Karachi should be worked to its full capacity and to the best advantage in the public interest. At the same time the Government have formulated a definite policy as to development of the industry on land that has not yet been appropriated to the purpose. It is their present view that such development could best be entrusted to private enterprise and that it will probably tend to the greatest efficiency and therefore to the greatest public advantage, if the whole of the area at present lying undeveloped to the west of the existing factories at Maurypur is leased to a single party.

Scottish Agricultural Industries

Acquisition of Share Capital of Two Companies

Agreements have been concluded by which Scottish Agricultural Industries, Ltd., will acquire the whole of the share capital of Barclay Ross and Hutchison, Ltd., and the whole, or a large part, of the share capital of the Aberdeen Commercial Co., Ltd. The shareholders of the two companies in question will receive, as part of the consideration to be paid, not more than 32,500 preference shares of Scottish Agricultural Industries. They have already given their consent to the exchange of shares.

Scottish Agricultural Industries, Ltd., was registered in 1928; its authorised capital is £1,750,000, divided into 552,000 6 per cent. cumulative preference shares, 800,000 ordinary shares, 321,500 deferred shares, and 76,500 in shares to be issued as either class at the discretion of the directors. It was formed to consolidate the fertiliser and feeding stuffs industry in Scotland. The Aberdeen Commercial Co., Ltd., was formed in 1837 and registered as a limited company in 1887. The authorised capital is £100,000 in £5 shares. Barclay Ross and Hutchison, Ltd., has a share capital of £20,000 (7,500 preference and 12,500 ordinary £1 shares).

Quinine for Albania

H.M. Chargé d'Affaires at Durazzo reports that the Ministry of Finance of the Albanian Government are calling for tenders, to be presented by September 10, for the supply and delivery at Tirana of the following annual requirements of quinine:—

Kgs.	
1,250	compressed sulphate of quinine.
250	,, bi sulphate ,,
500	sugar-coated ,, ,,
500	,, sulphate ,,
500	chlorohydrate of quinine, sugar coated.
500	chocolate with quinine.
300,000	ampules of 1·00 grams. bichlorohydrate of quinine.
300,000	,, 1·50 ,, ,, ,,
150,000	,, 0·25 ,, ,, ,,

Firms desirous of offering quinine of British manufacture may obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W.1. (Reference B.X. 5,621 should be quoted.)

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

MIXTROL OIL CO., 43, Berners Street, W., oil refiners. (C.C., 31/8/29.) £19 18s. July 9.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

RIMMEL (EUGENE), LTD., London, E., manufacturers of toilet requisites. (M., 31/8/29.) Reg. August 13, £9,000 debentures; general charge. *£6,508. June 14, 1929.

New Companies Registered

JOHNSON BROTHERS (AYLESFORD), LTD., Vale Road East, Tonbridge. Registered August 24. Nominal capital, £10,000 in £1 shares. To adopt an agreement with A. F. Johnson and H. J. Johnson and to carry on the business of road makers formerly carried on by them at Aylesford, Kent, and that of tar distillers, by-product, tar macadam, coke and patent fuel and chemical manufacturers, etc. Directors: A. F. Johnson, Medway Chemical Works, Aylesford, T. A. Lobley, J. B. Lane and W. C. Forbes.

JOHN AND E. STURGE (CITRIC), LTD. Registered August 22. Nominal capital, £25,000 in £1 shares. To acquire the branches or parts of the businesses carried on by Confectionery Ingredients and Essences, Ltd., and John and E. Sturge, Ltd., respectively, that relate to the manufacturer and producing, buying, selling, importing and exporting and otherwise dealing in citrate of lime and citric acid and by-products produced in the manufacture thereof, and to acquire patents and trade marks relating to citrate of lime, citric acid, etc., belonging to such companies, and to adopt an agreement with Rowntree and Co., Ltd., and the said two companies. Directors: H. L. Wilson, Elmfield, Selly Oak, Birmingham, A. L. Wilson, F. G. Fryer, A. P. Wilson, J. B. Morrell.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Plant for Charcoal Production.—An active timber exploiting company in Colombia desire to get into touch with United Kingdom manufacturers of the undermentioned plant: Plant for the production of charcoal; plant for the production of the following by-products: methyl (wood) alcohol, acetone, acetic acid, methyl acetone, tar oil for paints, solvent oils, flotation oils, creosote (preservative and medicinal); producer gas plant for use with internal combustion engines; and tannin extraction plant. (Reference No. B.X. 5,617.)

Creosote.—The South African Railways and Harbours Administration is calling for tenders, to be presented in Johannesburg by September 5, for the supply of 60,000 imperial gallons of creosote. (Tender No. 1,542.) (Reference No. B.X. 5634.)